Data Management Plan: Department of Geology and Mineral Industries (DOGAMI) Oregon Beach And Shoreline Mapping Analysis Program (OBSMAP)

(Taken from NOAA Data Sharing Template and adapted for IOOS Certification)

I. Type of data and information created

1. **What data will you collect or create in the research?**
   Contextual statement describing what data are collected and relevant URL (IOOS Certification, f 2)
   Physical environmental data, such as discrete station beach profiles and tidal-datum based shorelines, have been collected along the Oregon Coast by the Oregon Department of Geological and Mineral Industries (DOGAMI) since October 2004. These data make up the Oregon Beach and Shoreline Mapping Program (OBSMAP). The data are the product of multiple funding partners, including the Northwest Association of Networked Ocean Observing System (NANOOS), the Oregon Department of Land Conservation and Development (DLCD), Oregon Parks and Recreation Department (OPRD), City of Cannon Beach, the Hatfield Marine Science Center, and federal government agencies such as the Federal Emergency Management Agency (FEMA) and the US Army Corps of Engineers (USACE). In all cases, the data are collected using Real-Time Kinematic Differential Global Positioning System (RTK-DGPS) at seasonal to annual timescales, post-processed at the DOGAMI Newport Coastal Field Office and disseminated via the web (http://nvs.nanoos.org/BeachMapping).

2. **What data types will you be creating or capturing?**
   The OBSMAP captures changes taking place at multiple discrete transect locations along the Oregon coast. These transects show the degree of change (horizontal and vertical) taking place across the sub-aerial beach down into the inter-tidal zone. Given that these data represent discrete stations along the shore, tidal (Mean Higher High Water) datum-based shorelines are also measured in order to better understand the alongshore variations in the beach, which may be the product of rip current embayments, hotspot erosion due to storms, or changes due to climate phenomena such as El Niños and La Niñas.

3. **How will you capture or create the data?**
   Describe how the data are ingested (IOOS Certification, f 2)
   The data are collected at a variety of timescales but most commonly seasonally or annually using RTK-DGPS, post processed using Matlab, and disseminated via the web. The steps involved in data collection are manual and are undertaken several times per year. The processed data are eventually stored on a DOGAMI server and accessed using a json script via the NVS Beaches and Shoreline Changes web portal (http://nvs.nanoos.org/BeachMapping).

   Describe how data are managed (IOOS Certification, f 2)

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The data are managed and processed by the PI. The data are stored on hard drives in EXCEL and mat-file formats. Back-up of data occurs locally on weekly timescales, as well as externally on offsite hard drives.

Describe the data quality control procedures that have been applied to the data. (IOOS Certification, f 3)

We use Trimble® R7/R8 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 R8 "rover" GPS. Trimble reports that both the R7/R8 GPS systems have horizontal errors of approximately ±0.8-cm + 1ppm (parts per million * the baseline length) and ±1.5-cm in the vertical when operated in real-time kinetic (RTK) mode. When operated in static GNSS mode, Trimble reports both receivers having errors of ±0.3-cm + 0.1ppm (parts per million * the baseline length) in the horizontal and ±0.35-cm in the vertical.

To convert a space-based positioning system to a ground-based local grid coordinate system, a precise mathematical transformation is necessary. While some of these adjustments are accomplished by specifying the map projection, datum, and geoid model prior to commencing a field survey, an additional transformation is undertaken whereby the GPS measurements are tied to known ground control points. This step is called a GPS site calibration, such that the GPS measurements are calibrated to ground control points with known vertical and horizontal coordinates using a rigorous least-squares adjustments procedure. The approach used is to occupy the control benchmark by undertaking 180 GPS epoch measurements (~3 minutes of measurement per calibration site) using a fixed-height 2.0 m GPS pole and tripod. A local site calibration is then implemented in the field using the Trimble TSC2 GPS computer controller and re-evaluated in the office using Trimble Business Office software (v3.7).

During post processing, the data are subject to both quantitative and qualitative QA/QC procedures after they are collected. These include:
Exclusion of data measurements > +/-1 m of horizontal offset from either side of the predefined transect line. Previous analyses (e.g. Allan et al., 2012) have demonstrated that the horizontal variability during surveys is generally minor, typically less than ±0.25 m either side of the transect line. This results in negligible vertical uncertainties due to the relatively uniform nature of beaches characteristic of much of the Oregon coast (Ruggiero et al., 2005).
Removal of spurious elevation data. Data spikes that are clearly erroneous relative to adjacent points are also removed.

From our previous research at numerous sites along the Oregon coast, this method of surveying can reliably detect elevation changes on the order of 4-5 cm, that is, well below normal seasonal changes in beach elevation, which typically varies by 1–2 m (Ruggiero and others, 2005; Allan and Hart, 2007, 2008)

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.

Further, we maintain documentation of equipment operation/deployment times, shipping logs, and instrument maintenance history logs, as appropriate, that are available upon request.

4. **If you will be using existing data, state that fact and include where you got it. What is the relationship between the data you are collecting and the existing data?** Since the time series of collected beach profile information reflects data collected since 2004, we extend the length of the time series using lidar data (~1 point/m^2) flown by the U.S. Geological Survey (USGS)/National Aeronautics and Space Administration (NASA)/NOAA. These data were measured in October 1997 (pre El Niño), April 1998 (post El Niño), and in September 2002. The lidar data were downloaded from NOAA's Coastal Service Center, (http://www.csc.noaa.gov/digitalcoast/data/coastallidar/index.html) and gridded in Esri® ArcGIS® using a triangulated irregular network (TIN) algorithm; distance and elevation data were subsequently extracted from the grid lidar digital elevation models (DEMs) and combined with the GPS data. In addition, high-resolution lidar data (~8 points/m^2, bare-earth) measured by Watershed Sciences, Inc. (WSI) in 2008/2009 for DOGAMI were also analyzed and integrated into the beach profile data set. This was especially important for backshore areas where it was not possible to survey with the GPS equipment.

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II. Expected schedule for data sharing

Adheres to the NOAA Data Sharing Procedural Directive. The System is an operational system; therefore the RICE should strive to provide as much data as possible, in real-time or near real-time, to support the operation of the System. (IOOS Certification, f 4)

Once data have been acquired, processed, and quality controlled, DOGAMI generates PNG images of the profiles and change data. Typically, data is made available approximately 1-2 weeks after they have been collected. Access to the EXCEL and mat files is currently available upon request.

1. **How long will the original data collector/creator/principal investigator retain the right to use the data before opening it up to wider use?**
   N/A

2. **How long do you expect to keep the data private before making it available? Explain if different data products will become available on different schedules (Ex: raw data vs processed data, observations vs models, etc.)**
   N/A

3. **Explain details of any embargo periods for political/commercial/patent reasons? When will you make the data available?**
   N/A

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III. Standards for format and content

1. **Which file formats will you use for your data, and why?**
   How can the information be accessed? (IOOS Certification, f 2)
   DOGAMI shares data in a variety of file formats.
   EXCEL - Used for the data archiving. Available from DOGAMI upon request.
   ASCII - Text file that are easily read and parsed by people and programs. Available from DOGAMI upon request.
   Mat – files that may be read by people operating Matlab. Available from DOGAMI upon request.

2. **What file formats will be used for data sharing?**
   All of the Above.

3. **What metadata/ documentation will be submitted alongside the data or created on deposit/ transformation in order to make the data reusable?**
   Metadata is included as part of any data request. These data essentially describe the coordinate system used,for data collection. Primarily, Oregon State Plane (meters) coordinate system 3601 (North) or 3602 (South) is used depending on the region where the data were collected. The vertical datum is referenced to the North American Vertical Datum of 1988 (NAVD88, meters). All positional and elevation data are measured and provided in metric units (meters).

   Shoreline data that are collected in a few discrete locations reflect a tidal datum-based shoreline that is defined using the nearest Mean Higher High Water National Ocean Service (NOS) tide gauge station, and converted to NAVD88. Data files contain a description file documenting the dates when the beach was measured, while the column headers reflect the following: Point Id; Easting (m), Northing (m), Horizontal Distance (m, relative to the starting point = 0), Elevation (m).

4. **What contextual details (metadata) are needed to make the data you capture or collect meaningful?**
   N/A

5. **How will you create or capture these details?**
   N/A

6. **What form will the metadata describing/documenting your data take?**
   DOGAMI's data sets are described by detailed metadata in the form of FGDC XML files.

Additional descriptions are contained in ReadMe ASCII text files.

7. **Which metadata standards will you use and why have you chosen them? (e.g. accepted domain-local standards, widespread usage)**
   Metadata are created using FGDC standards since it is an accepted standard and mandated by the US Federal Government.

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IV. Polices for stewardship and preservation

1. **What is the long-term strategy for maintaining, curating and archiving the data?**
   Points of contact- Individuals responsible for the data management and coordination across the region (CV's attached); (IOOS Certification f 1.i)
   Jonathan Allan - Employee 15 years, Principal Investigator
   541-574-6658
   jonathan.allan@dogami.state.or.us

   Laura Gabel - Employee 7 years, Geologist
   541-574-1004
   laura.gabel@dogami.state.or.us

   Identify the procedures used to evaluate the capability of the individual (s) identified in subsection 997.23(f)(1) to conduct the assigned duties responsibly. (IOOS Certification, f 1.iii)
   The Oregon Department of Geology and Mineral Industries has a process in place for personnel evaluation. These evaluations are on file with DOGAMI Human Resources. All personnel listed have received excellent evaluations.

2. **Which archive/repository/database have you identified as a place to deposit data?**
   Documents of the RICE's data archiving process or describes how the RICE intends to archive data at the national archive center (e.g., NODC, NGDC, NCDC) in a manner that follows guidelines outlined by that center. Documentation shall be in the form of a Submission Agreement, Submission Information Form (SIF) or other, similar data producer-archive agreement (IOOS Certification, f 6).
   The Oregon Department of Geology and Mineral Industries is the state archive repository for geologic data collected by the agency. Historic data from OBSMAP stations are archived semi-annually.

3. **What procedures does your intended long-term data storage facility have in place for preservation and backup?**
   Multiple forms of hard disk drive (HDD) storage are implemented by DOGAMI. These include both local and offsite forms of HDD storage.

4. **How long will/should data be kept beyond the life of the project?**
   Data are indefinitely stored.

5. **What data will be preserved for the long-term?**

All data are publicly available and preserved.

6. **What transformations will be necessary to prepare data for preservation / data sharing?**
   Raw data are processed and formatted, analyzed, and quality controlled by the methods described above.

7. **What metadata/ documentation will be submitted alongside the data or created on deposit/ transformation in order to make the data reusable?**
   FGDC standard metadata are available per deposit and transformation.

8. **What related information will be deposited?**
   Time series and processed GPS job files from individual surveys.

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V. Procedures for providing access

1. **What are your plans for providing access to your data? (on your website, available via ftp download, via e-mail, or another way)**
   Describe how data are distributed including a description of the flow of data through the RICE data assembly center from the source to the public dissemination/access mechanism. (IOOS Certification, f 2 and 4)
   DOGAMI beach profiles, contour change plots, and trend plots are available via the web shortly after they have been collected (typically within 1-2 weeks). These data can be accessed via the NVS Beach and Shoreline Changes portal (http://nvs.nanoos.org/BeachMapping), and the Oregon Beach and Shoreline Mapping Program (http://www.oregongeology.org/sub/nanoos1/index.htm)

   Access to the reduced (processed) beach profile and contour change data are available upon request via email to the principle investigator.

2. **Will any permission restrictions need to be placed on the data?**
   DOGAMI data and products are freely available for public use. When referenced, please provide a link to the DOGAMI homepage.
   Examples:
   1) Standard html:
      Data courtesy of < http://www.oregongeology.org/sub/nanoos1/index.htm >
   2) Offline references, choose the appropriate form from the recommended acknowledgements below.
      - Short form (figure captions, etc.)
        "... data from the Oregon Department of Geology and Mineral Industries (DOGAMI)."
      - Longer form (in text)
        "...data were furnished by the Newport Coastal Field Office, Oregon Department of Geology and Mineral Industries."
      - Full form (acknowledgements at conclusion of papers, etc.)
        "...data were furnished by the Newport Coastal Field Office, Oregon Department of Geology and Mineral Industries, under the sponsorship of the Northwest Association of Networked Ocean Observing System, U.S. Fish and Wildlife, and the U.S. Army Corps of Engineers."

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3. **With whom will you share the data, and under what conditions?**
   Data are publicly available.

4. **Will a data sharing agreement be required?**
   In general, a data sharing agreement will not be required. However, data should be properly acknowledged.

5. **Are there ethical and privacy issues? If so, how will these be resolved?**
   N/A

6. **Who will hold the intellectual property rights to the data and how might this affect data access?**
   The funding agency & the Oregon Department of Geology and Mineral Industries through a contractual agreement.

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VI. Previous published data

Allan, J. C., and Hart, R., 2007, Assessing the temporal and spatial variability of coastal change in the Neskowin littoral cell: Developing a comprehensive monitoring program for Oregon beaches Oregon Department of Geology and Mineral Industries, Open-file-report O-07-01.

Allan, J. C., and Hart, R., 2008, Oregon beach and shoreline mapping and analysis program: 2007-2008 beach monitoring report: Oregon Department of Geology and Mineral Industries, Open file report O-08-15.

Allan, J. C., Ruggiero, P., and Roberts, J. T., 2012, Coastal Flood Insurance Study, Coos County, Oregon: Oregon Department of Geology and Mineral Industries, Special Paper 44.

Ruggiero, P., Kaminsky, G. M., Gelfenbaum, G., and Voight, B., 2005, Seasonal to interannual morphodynamics along a high-energy dissipative littoral cell: Journal of Coastal Research, v. 21, no. 3, p. 553-578.

Trimble, 2016, Trimble R7 & R8 GNSS system datasheets: Trimble Navigation Limited.