# Dataset Description: Coos Estuary Sediment Dynamics

This document provides detailed information about seven datasets that were generated through a 2016 - 2020 collaborative research project titled *Improved Understanding of Sediment Dynamics for the Coos Estuary*. The project was supported by the National Estuarine Research Reserve System (NERRS) Science Collaborative, which is funded by the National Oceanic and Atmospheric Administration. All Science Collaborative supported projects that collect new data adhere to federal data sharing and archiving requirements.

Seven related datasets are described in this document:

1. Single beam echosounder data for Coos Bay bathymetry
2. Water property profiles
3. Water velocity profiles
4. Grain size distributions
5. Water property time series
6. Discharge of Winchester Creek
7. Hydrodynamic model output for year 2014

## About the Associated Project

**Project title**: Improved Understanding of Sediment Dynamics for the Coos Estuary
**Reserves involved in the project**: South Slough National Estuarine Research Reserve, OR
**Project period**: November 2016 to February 2020
**Science Collaborative project page**: www.nerrssciencecollaborative.org/project/Sutherland16
**Project lead and contact information**:

David Sutherland
University of Oregon
dsuth@uoregon.edu
541-346-8753

**Purpose:**
The Coos Bay estuary has a diverse set of end users who share a common need to better understand circulation and sediment transport under current and future conditions. The estuary is one of three Oregon estuaries designated as “deep draft development”, meaning that planners must balance industry, restoration, and natural resource goals. The South Slough National Estuarine Research Reserve and estuary users including Coos County, the Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, and the Oregon Institute of Marine Biology identified data gaps related to Coos estuary management objectives, such as updating the estuarine management plan, improving the future success of oyster restoration projects, informing fisheries habitat maps, and increasing data efficiency amongst community stakeholders.

**Abstract**:
This project sought to fill data gaps critical to addressing a range of Coos estuary management needs. Research objectives focused on characterizing present-day sediment distribution, monitoring sediment fluxes to the estuary, and modeling how circulation and sediment in the estuary will respond to perturbations due to both natural and human-induced causes, such as dredging. This information was used to produce a new bathymetric dataset for Coos Bay and to develop, validate, and use a new hydrodynamic model for the estuary that includes sediment.

## About Each Dataset

### 1. Single beam echosounder data for Coos Bay bathymetry

**General description of data**: Depth of estuary seafloor collected from a personal watercraft with a single beam echosounder. Depths are geolocated with positions and corrected for tidal range.

**Data collection period**: 2017 to 2018

**Geographic extent**: Data were collected in State Plane NAD83, Oregon South (meters) and extend throughout the Coos Estuary.

**File format**: text

**Data access and archival**: Presently available on GitHub: https://github.com/das7105/Coos-Bay-Bathymetry. Data will ultimately be archived with the National Centers for Environmental Information (NCEI).

### 2. Water property profiles

**General description of data**: Salinity, temperature, and turbidity profiles with depth taken using an electronic instrument called a CTD. Data were collected at distinct locations across the entire estuary and are tagged with location and time.

**Data collection period**: 2017 to 2018

**Geographic extent**: Within the greater Coos Estuary, extending from South Slough through the main channel and up either Isthmus Slough or the Coos River.

**File format**: NetCDF

**Data access and archival**: Data are archived and publicly available from the National Centers for Environmental Information (NCEI) at https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:0210797.

## 3. Water velocity profiles

**General description of data**: Profiles of water velocity with depth taken from an electronic instrument called an ADCP. Data were collected at distinct locations across the entire estuary and are tagged with location and time.

**More about the data:**

- RDI software was used to acquire velocity data and correct for boat motion using GPS position.

**Data collection period**: 2017 to 2018

**Geographic extent**: Within the greater Coos Estuary, extending from South Slough through the main channel and up either Isthmus Slough or the Coos River.

**File format**: NetCDF

**Data access and archival**: Data are archived and publicly available from the National Centers for Environmental Information (NCEI) at https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:0210797.

## 4. Grain size distributions

**General description of data**: Sediment grab samples collected from the seafloor. Each sample is classified based on the percentage of the sample within certain grain size classes. Data are tagged with location and time.

**Data collection period**: 2017 to 2018

**Geographic extent**: Within the greater Coos Estuary, extending from South Slough through the main channel and up either Isthmus Slough or the Coos River.

**File format**: NetCDF

**Data access and archival**: Data are archived and publicly available from the National Centers for Environmental Information (NCEI) at https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:0210797.

## 5. Water property time series

**General description of data**: Salinity, temperature, and turbidity data collected at discrete depths with an electronic instrument called a CTD secured to a mooring. These data are time series of water properties at singe locations in the estuary.

**Data collection period**: 2017 to 2018

**Geographic extent**: Within the greater Coos Estuary, extending from South Slough through the main channel and up either Isthmus Slough or the Coos River.

**File format**: NetCDF

**Data access and archival**: Data are archived and publicly available from the National Centers for Environmental Information (NCEI) at https://data.nodc.noaa.gov/cgi-bin/iso?id=gov.noaa.nodc:0210797.

## 6. Discharge of Winchester Creek

**General description of data**: Daily mean discharge of Winchester Creek, the largest source of freshwater to the South Slough. Data recorded by a river gage installed and maintained by the Coos Watershed Association.

**Data collection period**: 2017 to 2019

**Geographic extent**: Latitude: 43.26350 Longitude: -124.31931

**File format**: Excel

**Data access and archival**: Publicly available on the Coos Watershed Association website.

## 7. Hydrodynamic model output for year 2014

**General description of data**: A hydrodynamic model was used to simulate 3-D circulation of the Coos estuary. Model output includes salinity, sea level, velocity, and suspended sediment, recorded hourly for the year 2014. For a description of these data, see Conroy et al. 2019 or Eidam et al. 2020.

The table below outlines the experiments available (i.e., the forcing conditions vary or the geometry and bathymetry of the estuary are changed). For each run, the river discharge varied according to season. The seasonal runs were 3 months long.

| Case | Geometry | Bathymetry | Season | Sediment | Output | Notes |
|---|---|---|---|---|---|---|
| 1 | Present | Present | Year-long | No | hourly | Conroy et al. 2019 |
| 2 | Present | Present | Winter | Yes | 15-min | Eidam et al. 2020 |
| 3 | Present | Present | Summer | Yes | 15-min | Eidam et al. 2020 |
| 4 | Present | Proposed | Winter | Yes | 15-min | Eidam et al. 2020 |
| 5 | Present | Proposed | Summer | Yes | 15-min | Eidam et al. 2020 |
| 6 | Historic | Historic | Winter | Yes | 15-min | Eidam et al. 2020 |
| 7 | Historic | Historic | Summer | Yes | 15-min | Eidam et al. 2020 |

**Data collection period**: Model output for 2014

**Geographic extent**: Entire Coos Estuary (i.e., within the greater Coos Estuary, extending from South Slough through the main channel and up either Isthmus Slough or the Coos River) and extending out of the estuary mouth into the nearshore coastal ocean.

**File format**: NetCDF

**Data access and archival**: These large datasets (>20 terabytes in total) can be shared with the public or scientists upon request. Contact David Sutherland, dsuth@uoregon.edu.