1. DATA AND INFORMATION TYPES

A. Provide a contextual description of the data stream.

Stations from this data provider include two shore stations and three historic intertidal shore stations. Data collection was supported by multiple awards to San Francisco State University and an award from NOAA's Integrated Observing System to the Central and Northern California Ocean Observing System at the Monterey Bay Aquarium Research Institute (NA21NOS0120090).

The Carquinez shore station is located on the California Maritime Academy (Cal Maritime) pier and maintained by the Estuary and Ocean Science (EOS) center (formerly the Romberg Tiburon Center) of San Francisco State University. The station has been operational since 2008 and consists of a fixed point in situ water quality station and a meteorological station. The water quality sensors provide near-real time observations of water salinity, temperature, dissolved oxygen, chlorophyll fluorescence, turbidity and pH. This station is maintained by staff of EOS.

The Tiburon shore station is maintained by the Estuary and Ocean Science (EOS) center (formerly the Romberg Tiburon Center) of San Francisco State University. The station has been operational since 2002 and consists of a fixed point in situ water quality station and meteorological sensors. The in-water sensors are fixed to a pier and provide near-real time observations of water salinity, temperature, dissolved oxygen, chlorophyll fluorescence, turbidity and pH. This station is maintained by staff of EOS.

The following Bodega Head, Kibesillah Hill, and Hopkins sites are now historic and are no longer active.

The Bodega Head intertidal shore station is rigidly mounted to the rocks in the intertidal zone in Bodega, CA. Data from this station is not transmitted in real-time, it is manually downloaded at the end of each deployment. Deployments were seasonal, ranging from March to September and consisted of a sensor being mounted in the rocky intertidal to monitor water temperature and chlorophyll. Seasonal deployments were made annually from 2007-2016.

The Kibesillah Hill intertidal shore station is rigidly mounted to the rocks in the intertidal zone at Kibesillah Hill in Mendocino County, CA. Data from this station is not transmitted in real-time, it is manually downloaded at the end of each deployment. Deployments were seasonal, ranging from March to September and consisted of a sensor being mounted in the rocky intertidal to monitor water temperature and chlorophyll. Seasonal deployments were made annually from 2007-2016.

The Hopkins intertidal shore station was installed in the mid-intertidal zone (~ 0-0.3 m above MLLW) at Hopkins Marine Station of Stanford University in Pacific Grove

California, USA. Data from this station is not transmitted in real-time, it must be manually downloaded at the end of each deployment. Deployments were seasonal, ranging from January-March to November and consisted of a sensor being mounted in the rocky intertidal to monitor water temperature and chlorophyll. Seasonal deployments were made annually from 2008 - 2014.

The stations can be accessed through the CeNCOOS data portal: http://l.axds.co/2ChZHMI

B. How many station locations are there for this data stream?

These are the 2 active stations:
Carquinez, Vallejo, CA (38.065N, 122.2302W)
Tiburon Pier, San Francisco Bay, CA (TIBC1) (37.89155N, 122.446W)
These are the 3 historic stations:
Bodega Head Intertidal Shore Station, Bodega, CA (38.3187N, 123.0742W)
Kibesillah Hill Intertidal Shore Station, Mendocino County, CA (39.600363N, 123.789155W)
Hopkins Marine Intertidal Shore Station, Pacific Grove (36.621817N, 121.904817W)

C. What are the specific variables of the data.

The variables for Carquinez Station include:
wind_speed_ws_s_wvt,wind_speed_ws_u_wvt,air_pressure,volume_fraction_of_oxygen_in_sea_water,sea_water_pressure,solar_radiation,mass_concentration_of_chlorophyll_in_sea_water,wind_from_direction_winddir_du_wvt,wind_from_direction_winddir_sdu_wvt,battery_voltage,sea_water_temperature,lwe_thickness_of_precipitation_amount,sea_water_electrical_conductivity,mass_concentration_of_oxygen_in_sea_water,wind_speed_of_gust,air_temperature,fractional_saturation_of_oxygen_in_sea_water,sea_water_practical_salinity,depth_reading,total_dissolved_solids,sea_water_ph_reported_on_total_scale,relative_humidity,turbidity

The variables for Tiburon Pier, San Francisco Bay, CA (TIBC1) station include:
wind_speed_ws_s_wvt,wind_speed_ws_u_wvt,air_pressure_cm_time_mean,air_pressure,volume_fraction_of_oxygen_in_sea_water,sea_water_pressure,solar_radiation_cm_time_mean,solar_radiation,mass_concentration_of_chlorophyll_in_sea_water,wind_from_direction_winddir_du_wvt,wind_from_direction_winddir_sdu_wvt,battery_voltage,sea_water_temperature,lwe_thickness_of_precipitation_amount,sea_water_electrical_conductivity,mass_concentration_of_oxygen_in_sea_water,wind_speed_of_gust,air_temperature_cm_time_mean,air_temperature,fractional_saturation_of_oxygen_in_sea_water,surface_downwelling_photosynthetic_photon_flux_in_air,surface_downwelling_photosynthetic_photon_flux_in_air_2,surface_downwelling_photosynthetic_photon_flux_in_air_cm_time_mean,sea_water_practical_salinity,depth_reading,total_dissolved_solids,sea_water_ph_reported_on_total_scale,relative_humidity,turbidity

The variables for Bodega Head Intertidal Shore Station include:
sea_water_temperature,mass_concentration_of_chlorophyll_in_sea_water,sea_surface_height_above_sea_level

The variables for Kibesillah Hill Intertidal Shore Station include: sea_water_temperature,mass_concentration_of_chlorophyll_in_sea_water,sea_surface_height_above_sea_level

The variables for Hopkins Marine Intertidal Shore Station include: mass_concentration_of_chlorophyll_in_sea_water

D. Provide information about the sampling platform or instrumentation.

The Carquinez shore station consists of a YSI Sonde 6600v2 attached to a PVC pipe fixed at 1 meter below MLLW attached to a dock piling at the California Maritime Academy pier in Vallejo, CA. The sensor measures conductivity, temperature, chlorophyll, depth, turbidity, and pH at 6 minute intervals. The sensor is telemetered over an ethernet line.

The Tiburon shore station now consists of a Sea-Bird HydroCat-EP that measures temperature, conductivity, dissolved oxygen, pH, chlorophyll and turbidity. The sensors are 1 meter below MLLW and attached to a piling at the EOS pier in Tiburon, CA. Data are currently telemetered to EOS and are in the process of completing the link to Axiom.

See CeNCOOS Shorestaton Standard Operating Procedure (SOP) for more information: https://www.cencoos.org/wp-content/uploads/2020/03/cencoos_Standard_Operating_Procedures.pdf

The sampling platform for the Bodega Head Intertidal Shore Station includes: Onset TidbiT v2 Water Temperature Data Logger - UTBI-001 and WET Labs ECO FL fluormeter. Station details information can be found: https://www.cencoos.org/data/shore/intertidal/bodegahead

The sampling platform for the Kibesillah Hill Intertidal Shore Station includes: Onset TidbiT v2 Water Temperature Data Logger - UTBI-001 and WET Labs ECO FL fluormeter. Station details information can be found: https://www.cencoos.org/data/shore/intertidal/kibesillah

The sampling platform for the Hopkins Marine Intertidal Shore Station includes: WET Labs ECO FL fluormeter.

2. Data Pathway

A. Is a data sharing agreement required?

The data may be used and redistributed for free but is not intended for legal use, since it may contain inaccuracies. Neither the data Contributor, ERD, NOAA, nor the United States Government, nor any of their employees or contractors, makes any warranty, express or implied, including warranties of merchantability and fitness for a particular purpose, or

assumes any legal liability for the accuracy, completeness, or usefulness, of this information.

B. In which format(s) was data received by CeNCOOS?

Telemetry is in the process of being set up between SFSU and Axiom.
Tiburon: Telemetry is on the process of being set up between EOS and Axiom.

C. How can the information be accessed?

The data will be available through the CeNCOOS data portal, where it can be downloaded or explored through interactive visualizations. Specifically, data are available from two unique access points:
- File Downloads (CSV)
- ERDDAP

D. What file formats will be used for sharing data, if different from original?

Data will be shared as CSV and through ERDDAP via the CeNCOOS data portal. Data will also be available for exploration in the CeNCOOS portals via interactive, graphical visualizations. Data are available from web harvest via the CeNCOOS website to the originator's THREDDS site.

E. Describe how the data is ingested(e.g. the flow of data from source to CeNCOOS data portals) and any transformations or modifications made to share data in the CeNCOOS data portal.

The telemetry path way is still being set up between SFSU and Axiom due to a change in infrastructure at SFSU and changes in personnel at SFSU. The telemetry path will hopefully be completed soon. Data are currently stored at EOS for eventual transmission to Axiom.

Graphic displays include a mapping service, customized interactive visualizations, and time-series plots of the unit values wherein each parameter is graphed independently. Back-end scripts handle the conversion of visualized data from CF standards to other, non-CF units that may be requested by the user. Data files may be downloaded by the user from the CeNCOOS data portal. A user request for a CSV file request pulls the data from the server cache. A user request for ERDDAP pulls data from the ERDDAP service using the same cache. For this data, no CF-standard names or units exist, therefore custom names of abundance_of_{scientific_name} were used.

Summary statistics generated within the interactive graphical displays may be requested by the user. Summary statistics may include minimum, maximum and mean values. Seasonal statistics, available on time series longer than 3 years, include mean, and 10th and 90th percentiles. Note: the number of points visually available to interactive users from the source data are limited when necessary using temporal binning, such as daily, weekly, monthly, seasonally and yearly.

F. What metadata or contextual information is provided with the data?

Metadata are shared in the CeNCOOS portals with descriptive narratives describing the data and linking back to the originator's site. Metadata are also available via ERDDAP:

Carquinez: https://erddap.cencoos.org/erddap/tabledap/carquinez.html
Tiburon Pier, San Francisco Bay, CA (TIBC1):
https://erddap.cencoos.org/erddap/tabledap/tiburon-water-tibc1.html
Bodega Head Intertidal Shore Station:
https://erddap.cencoos.org/erddap/tabledap/bodega-head-intertidal-shore-sta.html
Kibesillah Hill Intertidal Shore Station:
https://erddap.cencoos.org/erddap/tabledap/kibesillah-hill-intertidal-shore.html
Hopkins Marine Intertidal Shore Station:
https://erddap.cencoos.org/erddap/tabledap/hopkins-marine-intertidal-shore-.html

G. Are there ethical restrictions to data sharing?
No

a. **If so, how will these be resolved?**
N/A

H. Who holds intellectual property rights (IPR) to the data?
San Francisco State University and CeNCOOS

I. Describe any effect of IPR on data access.

3. Data Source and Quality Control

A. Indicate the data source type (i.e. Federal, Non-Federal, University, State Agency, Local Municipality, Military Establishment (branch), private industry, NGO, non-Profit, Citizen Science, Private individual)
University

a. If Federal data source, were changes applied to the data?
N/A

b. If Yes, describe any changes to the data that require documentation?
N/A

B. Indicate the data reporting type (e.g. real-time, historical).
Real-time:
Carquinez
Tiburon Pier, San Francisco Bay, CA (TIBC1)

Historical:
Bodega Head Intertidal Shore Station
Kibesillah Hill Intertidal Shore Station

Hopkins Marine Intertidal Shore Station

C. If real-time, list the QARTOD procedures that are currently applied.

The QARTOD tests that have been applied to the data by CeNCOOS are: timing gap, syntax, location, gross range, climatology, spike, rate of change, flat line, and attenuated signal test. Refer to CeNCOOS Data Management System plan for details.

D. If real-time, list the QARTOD procedures that are planned for implementation.

No further QARTOD tests are planned.

E. What is the status of the reported data? (e.g. raw, some QC, incomplete, delayed mode processed but not QC'd)

Some QC by the originator for:
Bodega Head Intertidal Shore Station
Kibesillah Hill Intertidal Shore Station
Hopkins Marine Intertidal Shore Station .

F. Describe the data control procedures that were applied by the originator.

For intertidal temperature: https://www.cencoos.org/data/docs/BH_temp_metadata.pdf
For intertidal chlorophyll: https://www.cencoos.org/data/docs/BH_flchl_metadata.pdf

a. Provide a link to any documented procedures.

N/A

G. Describe the data control procedures that were applied by CeNCOOS.

N/A

a. Provide a link to any documented procedures.

N/A

H. List the procedures taken for data that could not be QC'd as directed.

N/A

4. Stewardship and Preservation Policies

A. Who is responsible for long-term data archiving?

Data was aggregated for visualization and exploration with other layers in the CeNCOOS data portal. If the data provider chooses to archive these data at a national archive in the future, they may do it directly, or using the CeNCOOS-facilitated pathway to NCEI.

B. Which long-term data storage facility will be used for preservation?

Real-time and near real-time data are automatically archived to NCEI from CeNCOOS. Archived datasets can be viewed at
https://www.ncei.noaa.gov/access/integrated-ocean-observing-system/

For more information about CeNCOOS archival practices see DMP Section 4.8 Data Archival

C. Describe any transformation necessary for data preservation.

Data are formatted to NCEI specifications for archival. See DMP Appendix H1.1 NCEI Archival Agreement for descriptions of NCEI archival methods.

D. List the metadata or other documentation that will be archived with the data.

N/A