Appendix F1.4. Data Stream Plan: Phytoplankton, Monterey Bay Aquarium Research Institute, February 2018

1. Data and Information Types

A. Provide a contextual description of the data stream.

These data include count, size, and density of phytoplankton by species from 1989 to 2014 along the central coast of California. The source data were created from ship-based surveys conducted by the Monterey Bay Aquarium Research Institute (MBARI), which often used different survey methods from area to area or year to year. The data depict all phytoplankton data from all surveys, merged into continuous polygons.

The data are available in the CeNCOOS data portal: https://l.axds.co/2HEJCA2

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

N/A

C. What are the specific parameters of the data.

The parameters of this data include: count , thickness, width, and cells per liter of phytoplankton by species. Data can be filtered spatially, temporally, and by depth, shape, cruise, stations, and/or project.

D. Provide information about the sampling platform or instrumentation.

The source data were created from phytoplankton data in and around Monterey Bay from the Monterey Bay Aquarium Research Institute (MBARI) using the following quantitative phytoplankton operating procedures, as referenced in the BOG project cruise manual.

Quantitative Phytoplankton (Epifluorescence Counts)

Quantitative Phytoplankton samples (QPs) are microscopic enumeration of cells, usually using epifluorescence counts. These samples are ~60ml of seawater preserved in gluteraldehyde for analysis by a phytoplankton expert. The phytoplankton expert creates epifluorescence filters to count the number and type of phytoplankton in a portion of preserved sample in several different categories; Heterotrophic Phytoplankton, Synecchoccoccus, Red Fluorescing Picoplankton, Haptophyte, Autotrophic Flagellate, Cryptomonad, Prasinophyte, Phaeocyst, Pennate Diatom, Centric Diatom, Heterotropic Dinoflagellate, Heterotrophic Flagellate, Choanoflagellate protest, Leucocryptos Protist, Heterotrophic Protist, and Autotrophic Cilliates.

Sample Collection

1. The QP sample is taken at all the major stations on our MBTS and Line-67 cruises.

2. An extra chlorophyll 280 milliliter bottle labeled QP is rinsed three times and filled with surface seawater, which is taken from the surface niskin when the full CTD rosette comes onto deck.
3. After 2 ml of surface seawater is pipetted into pre-labeled yellow cryovial with repeater for the FCM sample, the rest of the surface seawater in the QP bottle is poured to shoulder of a brown glass square containing gluteraldehyde. The tops of the bottles are pre-labeled, as with all our samples labels take the form: CruiseCastNo #BottleNumber – SampleType, eg. "22906c01 #12 – QP".
    1. The brown glass squares are 4 oz. (125mL) Fisherbrand* Custom Cleaned Amber Wide-Mouth Packers With PTFE-faced, PE-lined caps attached. These bottles are rinsed in the laboratory with deionized water and dried upside down in the hood.
    2. The bottles are then filled with five milliliters of gluteraldehyde and recapped.
    3. The "charged" bottles are kept in a cold room until taken to sea for sampling.
    4. Do not take these gluteraldehyde bottles into van or fill them directly from niskins.
4. The filled sample bottles are stored in a cooler on the MBTS cruises or in a toxic refrigerator on the line-67 cruises.
5. For longer storage, the samples bottles are kept in a cold room (2-4 degrees Celsius). The samples from stations, C1, Mooring 1, and Mooring 2 are immediately processed.

Epifluorescence slides

1. The preparation of phytoplankton slides for epifluorescence is typically done by a scientist at MLML. She will do the following protocols.
2. The preparation of phytoplankton slides is done in a fume hood in dim light. One of the laboratories at MBARI has all the equipment for this toxic process.
    1. The filter rig for gluteraldehyde is set up in the hood of the for-mentioned laboratory.
    2. Place a 0.45um Gelman or Millipore Tuffryn diffuser filter on the filter tower.
    3. Wet base filter with water, and then suck membrane filter onto base w/o bubbles before putting on funnel.
    4. Then place a 0.2 um Nucleopore or Poretics membrane filter (shiny side up) on top of the diffuser filter.
    5. Invert the brown glass squares 10X before pouring a sample. Since the samples are already preserved, 25mls of the sample from the amber square is filtered until dry.
    6. On a pre-labeled glass slide (labeled the same as the information on the lid of the QP bottle), the filter is removed from the filter rig with the vacuum on and centered on the glass slide, label up.

7. Keep a hold of the filter so it does not fly away because of wind created by the hood.
8. One drop of immersion oil (type FF) is placed on the filter and covered with a cover slip.
9. The slide is placed in slide box and the slide box is stored in the toxics freezer.
10. The filter equipment is washed in water and put away, and any trash is discarded in the dry gluteraldehyde trash.

Cell types:

- 1-2um orange cells are cyanobacteria
- 2um red cells are picoeukaryotes. They quence quick
- 1 um red cells are prochlorococcus but will be quenched --- you wont see them.
- Large penates with extruded blobs are Psuedonitchia
- Large red blobs are often centrics. You can't see the frustrule and there is a big vacuole so the cytoplasm is irregularly shaped.
- Green cells are heterotrophs --- no chlorophyll
- If there is a bloom the field will be full of cells

2. Data Pathway

A. Is a data sharing agreement required?

Data are available publically.

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

Data were received as a one-time zipped CSV file from the data provider.

C. How can the information be accessed?

The data are available through the CeNCOOS data portal, where it can be viewed using interactive visualizations. Data files are also available for download from three unique access points: Web Mapping Service (WMS); Web Feature Service (WFS); and File Downloads (PNG, Shapefile, CSV).

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

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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 data were delivered directly to CeNCOOS by the originator, imported to PostgreSQL, and served to the client with GeoServer. For interactive visualizations of phytoplankton, a

geometry was created from latitude and longitude values . Additionally, observations were mapped to labels. These observations were then summarized into a hexagonal heat map with coverage at 5 zoom levels. Observations were summarized into colored hexagons at each zoom level. The color of the hexagon varies relative to the total number of observations/percent coverage within that hexagon.

F. What metadata or contextual information is provided with the data?
Metadata are shared in the CeNCOOS portal with descriptive narratives describing the data and linking back to the originator's site.

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?
Monterey Bay Aquarium Research Institute (MBARI)

I. Describe any effect of IPR on data access.
None

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)
State

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).
Historical

C. If real-time, list the QARTOD procedures that are currently applied.
Not required

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

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

Some QC as delivered from the originator(s) and presented with metadata.

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

QC methods are described and reported in the metadata.

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?

N/A

C. Describe any transformation necessary for data preservation.

N/A

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

N/A