

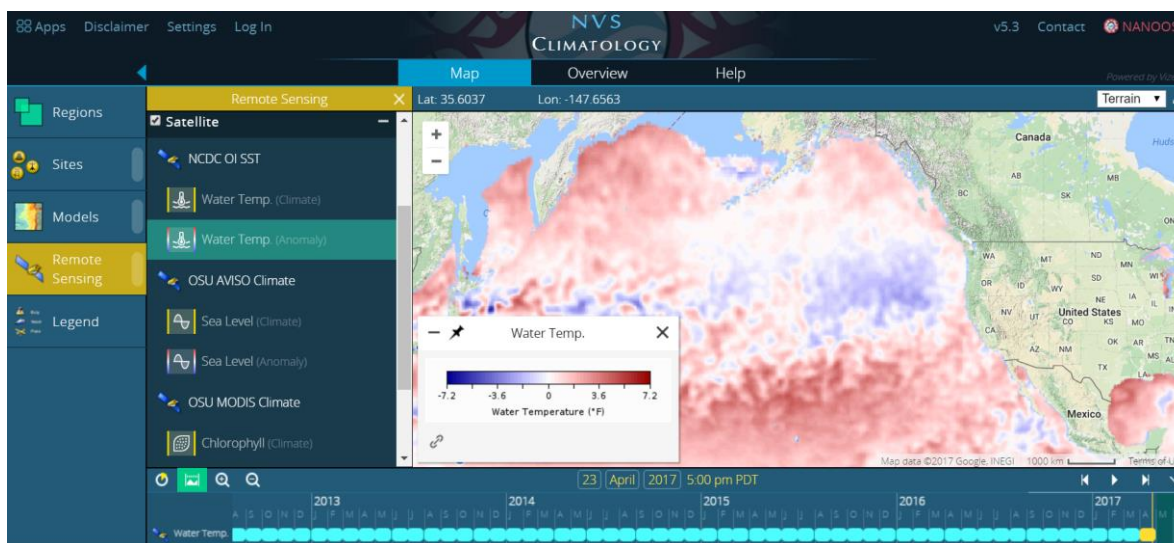
## How typical are current conditions?

NANOOS provides many sources of information for those wanting to track oceanographic conditions throughout the NE Pacific Ocean to be able to understand if the current conditions are typical or not. The **NVS Climatology App** was made for this purpose; by using this app people can easily compare present observations with data from previous years, thus gaining information on how typical or abnormal the current values are for variables like surface water temperature, chlorophyll, sea level, among others. NANOOS features data from both satellites and buoys, presenting these data relative to the typical conditions (= climatology) so one can visualize the current departure from those conditions (= anomaly). Here we provide information on how to use this app to view anomalies for the open ocean, coastal waters, and Pacific Northwest estuaries.

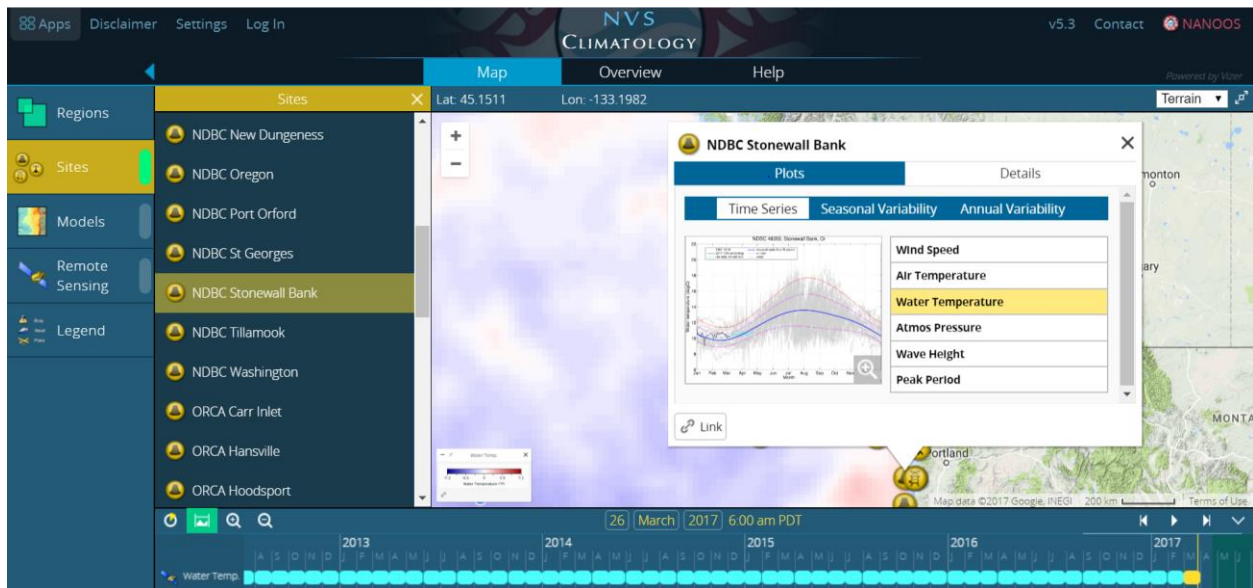
### Using the [NVS Climatology App](#):

A satellite view shows a wide expanse of the ocean. These are great tools for seeing large-scale phenomena like El Niño-La Niña or Marine Heat Waves (aka, the NE Pacific “blob”), which are associated with sea surface temperature anomalies. For more info on recent sea surface temperature anomalies, see the report from [Pacific Anomalies workshops](#).

To view satellite-measured water temperature anomalies, select either “NCDC OI” or “OSU MODIS” Water Temp. (Anomaly) under Satellite Remote Sensing. Temperature departures from normal (anomalies) show warmer than average waters as red. You can zoom in and out on the map and use the timeline at the bottom to compare months and years. Click the day, month, or year (yellow font) for easy comparison. The satellites are operated by NOAA (NCDC OI) and NASA (MODIS) with analysis by Oregon State University, a NANOOS partner.

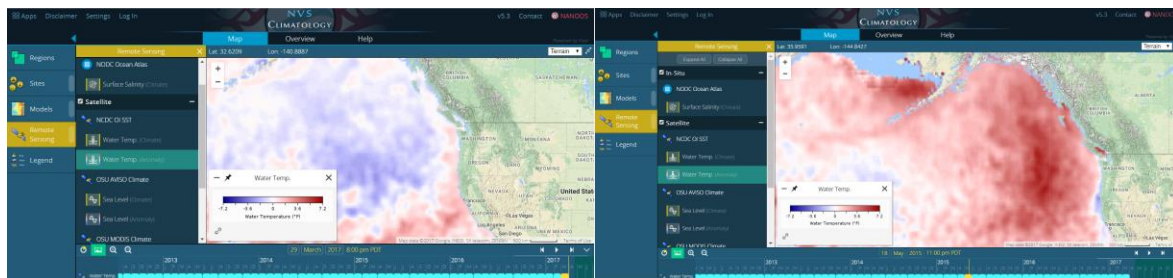


Another useful view from the Climatology App are anomalies in real-time data from buoys, fixed shore platforms, and land stations. Viewers can see a comparison of the real-time data to historical data and means. By selecting a specific site, the pop-up screen allows users to compare real-time water temperature, as well as wind speed, air temperature, etc. to the ~40-y records at these locations. Measurements spanning the entire record are in gray, the historical mean in blue, with +/- 1 standard deviation in magenta and + 2 standard deviations in red. QA/QC'd data from the current year is shown as a solid black line and raw data is cyan.

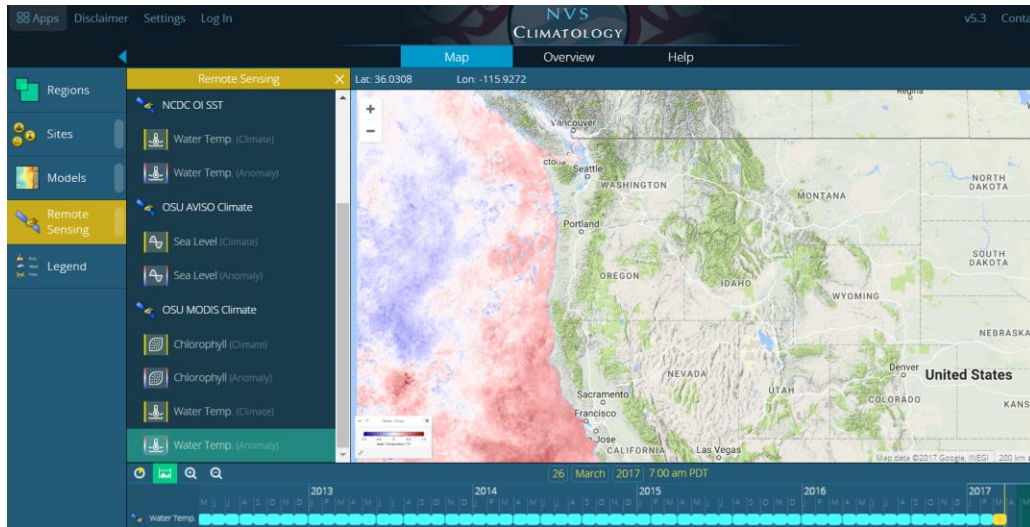


### ***What are the current water temperature conditions in the NANOOS region?***

Using the satellite data from the NVS Climatology App, one can see that during spring 2017, a large portion of offshore NE Pacific surface temperatures are currently anomalously colder than average, as shown from the NCEP OI satellite imagery. The spring 2017 conditions are very different from the warm water “blob” that persisted in the NE Pacific from late 2013 throughout 2015, reported about in the [Pacific Anomalies workshops](#).

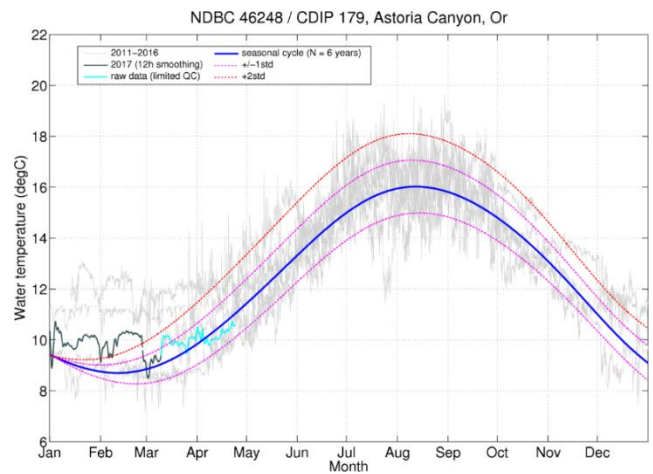
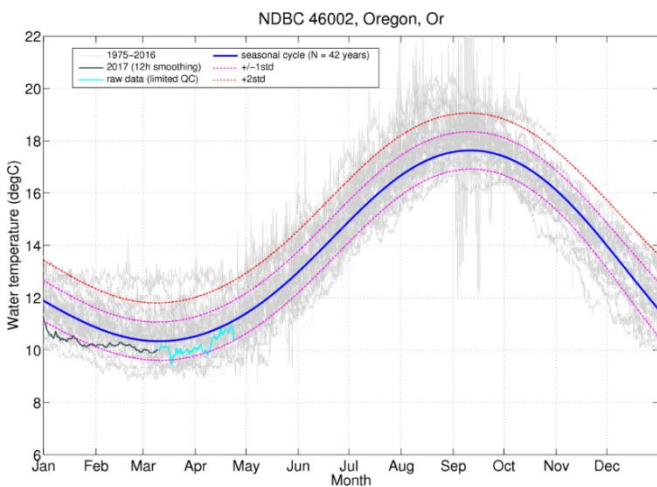


While the “NCDC OI SST” satellite projection shows sea surface temperatures on a global scale (user zoom-able), switching the view to the “OSU MODIS Climate” projection allows one to see higher-resolution imagery off the Pacific Northwest coast. With the added resolution of this projection, one clearly sees anomalously colder surface temperatures offshore, yet warmer than average waters along the continental shelf.



**Do the buoys and satellite data agree?**

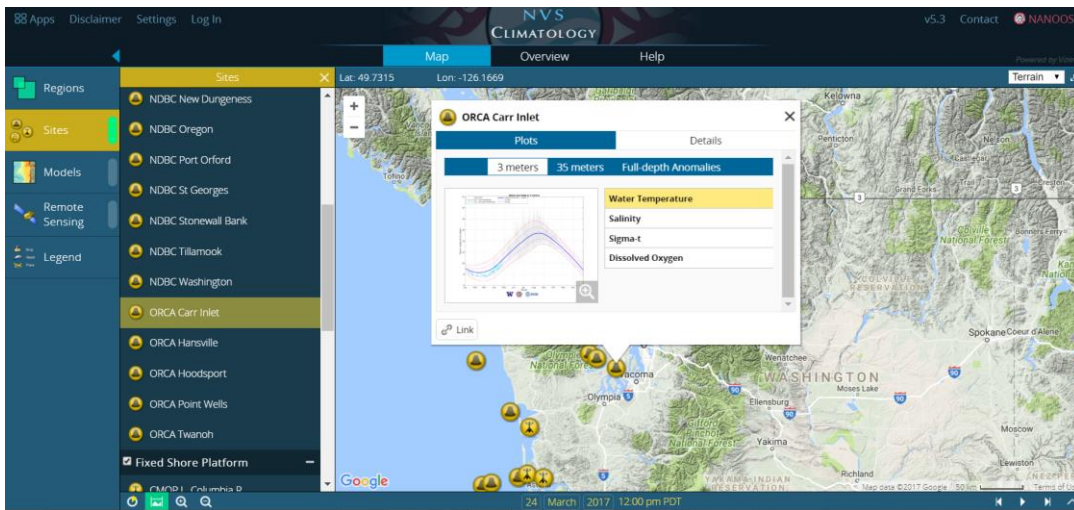
To confirm the satellite observations of colder water temperatures offshore versus warmer waters along the coastal margin, one can access measurements from buoy data. The NOAA NDBC 46002 buoy located 275 nautical miles from Coos Bay, OR, indicates slightly colder water temperatures this year (black and cyan line), compared to the dark blue line representing the average water temperature from the last 42 years. The CDIP Astoria Canyon buoy, located much closer to shore, has measured anomalously warmer waters, particularly at the start of 2017. These buoy data are consistent with the NCDC OI and OSU MODIS satellite water temperature anomaly imagery.



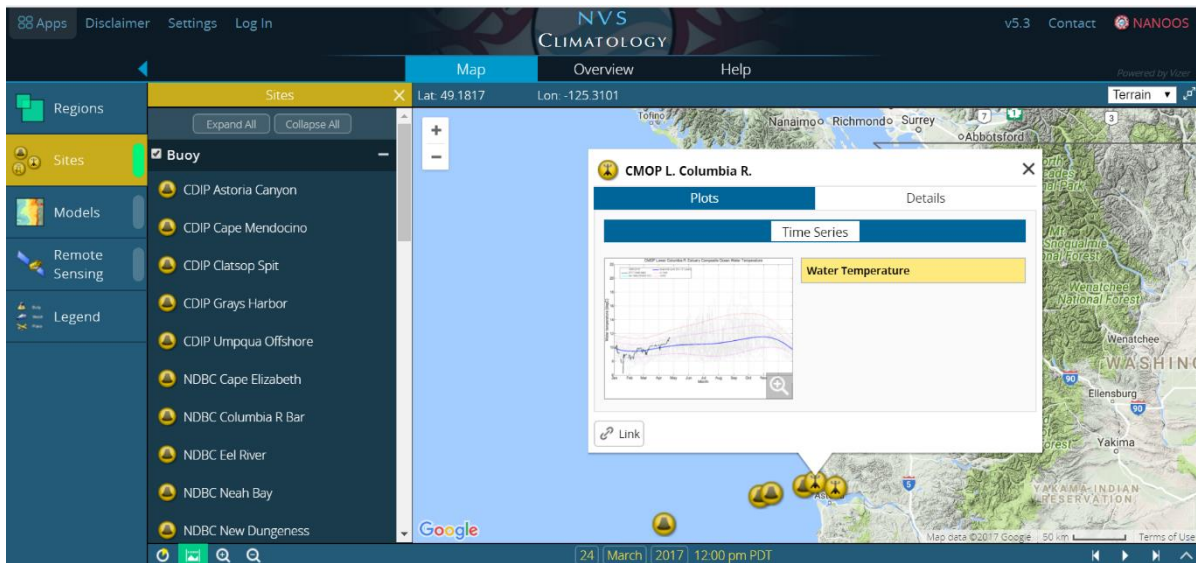


## What are the conditions in estuaries?

**For Puget Sound**, you may select one of the five Oceanic Remote Chemical Analyzer (ORCA) buoys moored throughout the estuary: Hansville near the entrance to Puget Sound, Hoodsport and Twanoh in Hood Canal, Point Wells in the Main Basin north of Seattle, and Carr Inlet in South Sound. These buoys also indicate oxygen and salinity values. ORCA buoys are operated by the University of Washington, a NANOOS partner with partial NANOOS support.

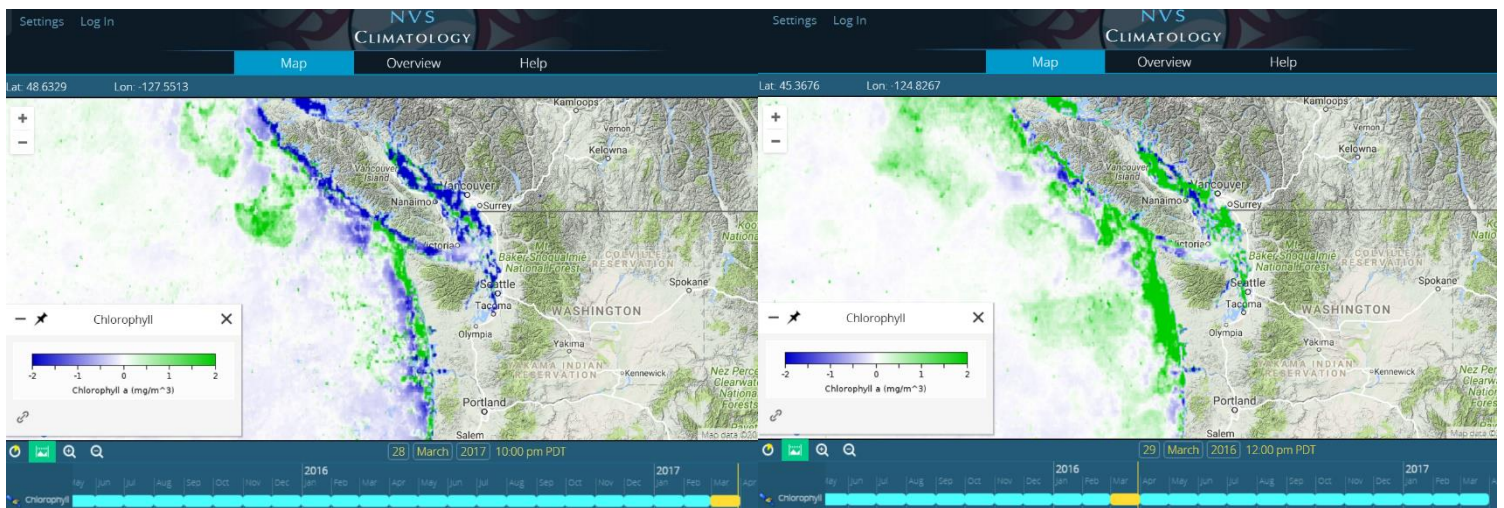


**For the Columbia River estuary**, select the CMOP fixed shore platform at the Lower Columbia River estuary to see the 21-y record of water temperature. The National Science Foundation's Center for Coastal Margin Observation and Prediction (CMOP) platforms are operated by Oregon Health and Science University, a NANOOS partner, with partial NANOOS support.



### ***How does chlorophyll look in the NANOOS region?***

From the OSU MODIS satellite data, one can also see average (climate) and anomalous chlorophyll concentrations. By using the timeline at the bottom of the NVS screen, one can see that current chlorophyll concentrations are noticeably lower in spring 2017 than they were at the same time last year, particularly in the Salish Sea and off the coast of Washington (shown in the plots below). This year's lower chlorophyll concentrations may be the result of a variety of factors, including lack of sunlight and high turbulence from winds/waves, etc. Checking back over time, one can see patterns and compare data types to better understand ocean dynamics.



### ***What other variables can be tracked in the NVS Climatology app?***

Remote sensing data for average surface salinity values on a global scale are available from 1981 – present from the NODC Ocean Atlas. Climate and Anomaly data for sea level are also provided from the OSU AVISO Climate satellite. Model outputs include global hindcast data for wave height and wave period, as well as wind speed and direction.

### ***Any questions?***

Contact us at [http://www.nanoos.org/contact\\_us/contact\\_us.php](http://www.nanoos.org/contact_us/contact_us.php)