NOAA West Watch: Reporting Regional Environmental Conditions & Impacts in the West

August 9, 2022
Call Agenda

- Project Background (Dan McEvoy)
- Regional Climate and ENSO brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Jan Newton, Henry Ruhl, Clarissa Anderson)
- Discussion - Environmental conditions and impacts reporting (All)
  - Additional impacts to share?
Project Background

• Run by the Western Regional Climate Center, in partnership with the NOAA Western Regional Collaboration Team (NOAA West)
• Standing contributions from the three Integrated Ocean Observing System Regional Associations.

• Project Goals:
  – Serve as forum for bringing together NOAA staff and partners from across the agency and region to share information about regional scale environmental observations and impacts on human systems.
  – Help facilitate interdisciplinary connections and the exchange of information among agency staff and partners on regional climatic and oceanic conditions, particularly departures from normal.

These webinars are not formal public releases of data.
How’s your summer going?

June 1-August 4 Precipitation

- Good start to Monsoon
- SW fires reduced
- Wet PNW

• PNW dries out
• Monsoon more spotty

https://app.climateengine.com/climateEngine
How’s your summer going?

June 1-August 4 Temperature

- Cool PNW
- Warm SW

PNW heats up
SW stays warm even with active Monsoon

https://app.climateengine.com/climateEngine
Snowy Crater Lake, Oregon June 18, 2022
Southwest Monsoon Update

Monsoon (June 15-August 4) precipitation

- 8-10+ inches of rain for some locations

Clear vegetation response to Monsoon rains; will help range and forest health conditions

July 20-August 3 NDVI Anomaly
Southwest Monsoon Update

- Small fraction, mostly southeast NM, <75% of average
- Biggest fraction (about 40% of total area) in the 125-200% of average category

https://cals.arizona.edu/climate/misc/SWMonsoonMaps/current/swus_monsoon.html
Tucson, AZ in a bit of a donut hole this year with below normal rainfall

Biggest wet monsoon anomalies this year are in central and northwest NM, including Albuquerque

https://xmacis.rcc-acis.org/
Monsoonal moisture surges northward

Flooding in Death Valley, NP

Photos NPS via AP

Heavy localized rains over the past week have increased soil moisture in eastern CA and Great Basin
Wildfire Season Update

From the National Interagency Fire Center:

• Alaska went big in early summer; Western US not so much
Wildfire Season Update

Graphic from Rick Thoman
Twitter: @AlaskaWx

Data source: Alaska Interagency Coordination Center
Updated to August 3, 2022
Daily values lightly smoothed
Smoke impacts have been much more localized this summer (so far) compared to 2020 and 2021.

https://worldview.earthdata.nasa.gov/
Current Wildfire Danger

- Fire danger has increased in the PNW with late-July heat wave accelerating drying
- Fire danger lower in the Sierra Nevada, Great Basin, and Southwest

https://app.climateengine.com/climateEngine

https://climatetoolbox.org/tool/climate-mapper
Significant Wildland Fire Potential Outlook

- Above normal fire potential still widespread in August-September due to both long-term drought and climatology (dry and hot)
Current Drought Snapshot

- Long-term drought (into year 3 or longer) still present across much of the west
- Monsoon has brought some relief vegetation/soil moisture in Southwest but contributes little to CO River Basin water supply
- Wet/cool spring and early summer brought improvement to the PNW
Colorado River Water Supply

More human remains discovered in Lake Mead's receding waters
By Nouran Salahieh and Elizabeth Wolfe, CNN
Updated 8:21 AM ET, Sun August 7, 2022

Lake Mead's low water levels reveal dead bodies, sunken boats, and ghost towns
Skeletal human remains continue to be discovered as Lake Mead's levels rapidly decline.
Scott L. Hall Scott L. Hall, USA TODAY
Published 3:41 p.m. ET Aug. 8, 2022

https://earthobservatory.nasa.gov/images/150111/lake-mead-keeps-dropping
Colorado River Water Supply

Shortage Condition I reached last year

Shortage Condition II reached this year

Current elevation: 1041 feet
Colorado River Water Supply

- Stage I shortage water cuts already in place for Arizona, Nevada, and California

- Talks between all basin states now underway to cut 2-4 million acre-feet next year
  - Perspective: California gets about 4.4 million acre-feet per year and Arizona about 2.8 million acre-feet per year

- State decisions on how much each state will cut should be reached sometime this month
ENSO Update

• ENSO Alert System Status: **La Niña Advisory**
• La Niña is present.
• Equatorial sea surface temperatures (SSTs) are below average across most of the Pacific Ocean.
• The tropical Pacific atmosphere is consistent with La Niña conditions.

- La Niña is favored to continue through 2022 with the odds for La Niña decreasing into the Northern Hemisphere late summer (60% chance in July-September 2022) before increasing through the Northern Hemisphere fall and early winter 2022 (62-66% chance).

Source: Climate Prediction Center
La Niña conditions still present with below average SSTs in the eastern equatorial Pacific

La Niña likely to continue into autumn; lower confidence for winter

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/
Aug-Oct Temperature and Precipitation Outlook
NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly
NCEI Optimum Interpolation SST

April 2022
NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly
NCEI Optimum Interpolation SST

May 2022
NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly
NCEI Optimum Interpolation SST

June 2022
Each of these four colors corresponds to increasing categories of MHWs as first proposed in Hobday et al. 2018.
Sea Surface Temperature

NANOOS: www.nanoos.org Climatology app

NDBC Washington

Seasonal Cycle
n=45 Yrs
-1 STD
+1 STD
+2 STD
2022
NANOOS: [www.nanoos.org](http://www.nanoos.org) Climatology app

### Sea Surface Temperature

- **CDIP Grays Harbor**: 17 yrs
- **NDBC Columbia River Bar**: 37 yrs
- **NDBC Stonewall Bank**: 34 yrs
- **NDBC Eel River**: 39 yrs

Graphs showing water temperature variation over seasons.
Fish Kill Watch!

Puget Sound Profiling Buoys

Dissolved Oxygen

NWEM: https://nwem.apl.washington.edu/index.shtml
NANOOS: www.nanoos.org Data Explorer
Hood Canal Oxygen

Twanoh Oxygen Anomaly, 2022 - Climatology

Hoodsport Oxygen Anomaly, 2022 - Climatology

NANOOS: www.nanoos.org Climatology app
Oxygen
Čháʔba buoy
Off La Push, WA

2.7 mg/L
The latest water measurements at the NEMO Observatory site where the Environmental Sample Processor (ESP) is located 13 miles off La Push, Washington. Data are updated in near-real time. These products are provided to help understand where toxic algae may be moving and the conditions that may influence toxic blooms.

“ESP-friday detected 24.84 ng/L pDA early this morning at the mooring location.”
S Moore 8/8/2022

This project is funded jointly by the U.S. Integrated Ocean Observing System (IOOS) and the NOAA National Centers for Coastal Ocean Science (NCCOS) Monitoring Event Response for Harmful Algal Blooms (MERHAB) program. The project has a multi-sector team of partners that bring expertise from academia, the sensor-building industry, government and the private sector.

S. Moore (NOAA) and J. Mickett (UW), lead PIs
NANOOS: www.nanoos.org Climatology app

Sea Surface Chlorophyll Anomaly
OSU MODIS

April 2022
May 2022
June 2022
July 2022

Chlorophyll a Anomaly (mg/m³)
To summarize:

Temperature

- La Niña signature continues at equatorial Pacific
- Heat anomaly in mid-Pacific persists; classifies as marine heat wave category II-III (strong – severe)
- Coastal WA & OR predominantly cool anomalies in May, transitioning to warm anomalies by July, near coast shows more fluctuation in July consistent with upwelling

Hypoxia watch

- Hood Canal became hypoxic earlier than typical and is ~1 mg/L, though below ~20 m
- La Push WA deep oxygen values below 3 mg/L, looks to be trending downwards

Chlorophyll-Phytoplankton

- HAB ESP deployed off La Push monitoring domoic acid in near real-time; quantifiable
- Ocean color indicates lower than average biomass along the west coast, but pockets of high
The Central and Northern California Ocean Observing System:
West Watch Update

hruhl@mbari.org
Multivariate Ocean Climate Index (MOCI)

MOCI include seasonal averages of the following data:
- Upwelling Index, NOAA
- Sea level from shore stations
- Alongshore wind, sea surface temperature, air temperature, sea level pressure from NOAA buoys

Regional climate indices:
- MEI: Multivariate ENSO Index
- PDO: Pacific Decadal Oscillation
- NOI: Northern Oscillation Index

García-Reyes M, Sydeman WJ. (2017). *California Multivariate Ocean Climate Indicator (MOCI) and marine ecosystem dynamics*. Ecological Indicators, 72, 521-529.
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Multivariate Ocean Climate Index (MOCI)

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WCOFS – 4 Aug  

Shore Stations – Last 180 days

- **Trinidad** (starting Feb 2013)  
  [https://data.caloos.org/](https://data.caloos.org/)

- **Bodega Bay** (BML_WTS, starting Feb 2009)

- **MLML Seawater Intake Mon. Sta.** (MLSC1, starting Sep 2010)
NDBC Sea Surface Temp – Last 180 days

Pt Arena - 19 NM North of Point Arena, CA (46014, Dec 2009)

Monterey - 27 NM WNW of Monterey, CA (46042, Mar 2018)

Cape San Martin - 55 NM West NW of Morro Bay, CA (46028, Dec 2009)

https://data.caloos.org/
Heatwave Classification

• Adaptation of Hobday et al.

• “…we consider an anomalously warm event to be a MHW if it lasts for five or more days, with [100 m integrated heat content] warmer than the 90th percentile based on a [42-year] historical baseline period.”

• Soon to include 3-day heatwave forecast via WCFOS

• Connects investment in HFR, gliders, tagging, and more through assimilation….to tools for a climate-ready Blue Economy

San Francisco Chronicle

Halibut fishing is ‘incredible’ in San Francisco Bay right now

Tara Boggs
June 14, 2023 | Updated June 14, 2023 12:14 pm

First, the Fish Fell From the Sky. Then They Washed Ashore.

In the past month, dead anchovies have been spotted on the streets of San Francisco. Last week, thousands appeared at the edge of a lagoon about 30 miles north.

By Lisa Adach-Riska
July 7, 2023

The New York Times

Rare sperm whale sinks on journey to beach: “This is not the end of the story”

By Kate笺man | 12 seconds ago

More

MENDOCINO VOICE

A sperm whale discovered washed ashore near Portuguese Beach sank as scientists tried to tow it, the Noyo Center for Marine Science reported.
NOAA West Watch Update: Southern California
Clarissa Anderson, SCCOOS Executive Director
9-Aug 2022
SCCOOS Automated Shore Stations

Sea Surface Temperature Anomalies

- SCCOOS shore stations ~ 17 years of data
- Ocean temps have been cooler for ~12 months, with a warm anomaly in the spring and early summer at most stations.
- WCOFS simulated temperature to 500m captures shoaling of the thermocline in May during peak upwelling season, with smaller pulses in early June

https://data.caloos.org/
West Coast wave activity in 2022 follows the long term climate trend.
- Powerful long period south swell in July affected some west coast stations.

West Coast sea surface temperatures (SST) also following the long term climate trend.
- Warm early summer conditions in SoCal Bight, then closer to normal.
- Warm pulses at some northern sites after a cool spring.
A powerful extratropical storm in the South Pacific generated waves >15 m (significant wave height) at its source.

These waves traveled across the Pacific, impacting coastlines across the ocean basin, with measured Hs exceeding the NOAA NCEP GFS operational wave model, shown in these plots.

South facing CDIP buoy stations in American Samoa and Hawaii recorded historically powerful waves at the longest periods measurable with the gauges, 20-30 seconds.

Southern coasts of Hawaii experienced severe coastal erosion, inundation, and damage to homes and infrastructure.

Waves from the remnants of Hurricane Darby were also measured in Hawaii at the same time, at shorter periods.

Long period swell recorded by west coast CDIP stations, too, e.g. 092 San Pedro, CA, but at more typical overall local energy levels.
California Underwater Glider Network

Line 90 Temperature (Interannual anomaly)

Line 90 Salinity (Interannual anomaly)

Line 90 Mean Temperature

Line 90 Mean Salinity

Southern California Temperature Index

Line 90 Temperature Anomaly
Harmful Algal Bloom Monitoring Alert Program (HABMAP)

*Pseudo-nitzschia* spp. blooming more at southern California sites Feb-June. Upwelling intensity will peak in July-August north of Pt. Conception, meaning we can expect this pattern to reverse in favor of larger blooms from San Luis Obispo County to the Oregon border.

Note: VIIRS SNPP currently not transmitting data; in safe-mode state
CA HAB Bulletin

C-HARM Probability of particulate Domoic Acid (pDA) for May 1-Aug 5 2022

May 2022 Pelican Stranding Event, 700 birds
-Domoic Acid eliminated as causative factor by CDFW

Uptick in California Sea Lion and Northern Guadalupe Fur Seal strandings from potential DA toxicosis in Central and Southern California in May and June

sccoos.org/california-hab-bulletin/
Roll out of stations:
- Bodega Marine Lab
- San Francisco Pier 17
- San Francisco Bay Cruises
- Santa Cruz Wharf
- MBARI Power Buoy - MB Bay
- Stearns Wharf
- Newport Beach Pier
- Del Mar Mooring - offshore
- Scripps Pier

Mosaic from June illustrates a range of diatom and dinoflagellate species, including *Pseudo-nitzschia* spp.

[https://ifcb.caloos.org/dashboard](https://ifcb.caloos.org/dashboard)
CalOOS Science Impact And Stakeholder Engagement Meeting held in May

Questions?
info@sccoos.org
Next NOAA West Watch:

Tentative date: October 18, 2022

Thanks!