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

April 26, 2022
Call Agenda

- Project Background (Dan McEvoy)
- Guest speaker: Dr. Joe Casola, *NOAA West Watch, Past, Present, and Future*
- 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.
My Background

• Began as Western Regional Climate Services Director, Jan 2022
• Based at NOAA’s Boulder, CO Campus
• Background as a climatologist
• Interests in snow hydrology, water resources, and climate adaptation
West Watch inspiration: 2015/2016 El Niño
Regional Coordination Proposal Goals

Changing Climate Conditions & Regional Impacts Coordination Goals:

1. Share and document anomalous environmental information and their impacts on human systems.

2. Improve internal awareness of unusual environmental observations across NOAA mission lines.

3. Improve communication and coordination between NOAA in the region (e.g. NMFS science centers and region, NWS region, NOS OCM and OCS, NESDIS NCEI, and OAR PMEL and ESRL) and NOAA funded regionally based partner entities involved in monitoring and communicating about changing climate conditions and impacts (e.g., IOOS, Sea Grant, RISA, State Climatologists, Western Regional Climate Center, etc).

4. Improve external communication of changing climate conditions, including but not limited to El Niño.
Widespread impacts across the West

Steve Priby, of the Deschutes River Alliance, holds a sockeye salmon in the Deschutes River. Priby found hundreds of the migratory fish dying of a bacterial infection that spreads in warm waters. (Photo courtesy of Steve Priby)

Monitoring suggests warm conditions are having negative consequences on the Puget Sound marine environment with increasing harmful algal blooms, increasing and early shellfish closures, lower dissolved oxygen levels, and unfavorable conditions for salmon and other cold-loving marine species. (VOL Dept. of Ecology, http://ecologywa.blogspot.com/2015/07)

Sockeye salmon veered off course to the Little White Salmon River to escape the heat of the Columbia River, but many died like the one in the foreground. In the background is a sockeye with large patches of white fungus. (Steve Ringman/The Seattle Times)

This is a California sea lion on Long Beach, Washington, apparently experiencing seizures from domoic acid poisoning in May 2015. Dan Ayres/Washington Department of Fish and Wildlife

The algae Pseudo-nitzschia, which produces the toxic domoic acid, is seen from an algae bloom sample collected this summer on the West Coast. One of the largest toxic algae blooms recorded off the West Coast is much deeper, more widespread and may go extend deeper than initially thought, say scientists who surveyed the event. (NOAA Fisheries via AP)

Major fires in the western U.S.

- Wolverine fire
- Paradise fire
- Chelan complex
- North Star fire
- Clearwater complex
- Cornet-Windy Ridge
- Soda fire

Fires in the western U.S. as of [date]

- Active fires over 25,000 acres
- Active fires under 25,000 acres

Sources: Inciweb nrcg.gov, CALFIRE Geosciences and Environmental Change Science Center

KELLY SHEA AND GARLAND POTTS / THE SEATTLE TIMES
Findings of Evaluation

• As a one-way communication tool, NOAA West Watch has an effective process for communicating technical environmental content to its intended audience.

• There is consensus that this information can be presented more effectively.

• NOAA West Watch is not an effective two-way communication tool in its current capacity and format. All groups appear to want more engagement but are discouraged by the lack of dedicated time and unclear method for discussion
Recommendations from Evaluation

• Bolster two-way communication
• Clarify goals, outcomes, and metrics for success
• Standardize time and format of presentations
• Improve accessibility of technical information
• Improve archive
  – Webinar recordings
  – Website organization/access
• Improve attendee feedback options
• Advertise and grow audience(s)
Ideas for improvement

• Who are the key audiences?

• Going back to monthly format, but alternating between monitoring discussion and project highlight

• “Open Mic” time at the beginning or end of a webinar

• Explicit metrics for success

• Broadening the functionality of the archive
Climate Briefing: Dan McEvoy
Water Year Temperature and Precipitation

October 1-April 23 Temperature Anomaly

October 1-April 23 % of Average Precipitation

• S. California, Arizona, and New Mexico stand out as warm and extremely dry

https://climatetoolbox.org/tool/climate-mapper
Calendar Year Temperature and Precipitation

January 1-April 23 Temperature Anomaly

January 1-April 23 % of Average Precipitation

- California mountains stand out as warm and whole Southwest extremely dry

https://climatetoolbox.org/tool/climate-mapper
Mountain Snowpack

April 1, 2022, Snow Water Equivalent

April 23, 2022, Snow Water Equivalent

https://www.nrcs.usda.gov/wps/portal/wcc/home/
Mountain Snowpack—California

- Record snowfall in December followed by record January-March dryness
- Third year in a row with low snowpack and (likely) early melt
- April snow beneficial but not a drought buster
Mountain Snowpack—Upper Colorado

- Melting early; less SWE gains from April storms
- Dust-on-snow events can accelerate melt
Runoff Forecasts

April-July, 2022 % of Median Runoff Forecast

- Below average runoff expected across most of West
- Critically low volumes forecast for some basins like the Humboldt River, Nevada
- Colorado River flows will be below average again
Active Start to Wildfire Season for Arizona and New Mexico

Current Large Incidents
April 25, 2022

2-week Evaporative Demand Drought Index ending April 22, 2022

https://app.climateengine.com/climateEngine

- High evaporative demand will draw moisture out of dead and live fuels leading to more flammable conditions

https://fsapps.nwcg.gov/
La Niña conditions still present with below average SSTs in the eastern equatorial Pacific

La Niña likely to continue into summer and possibly autumn
May Temperature and Precipitation Outlook
NOAA West Watch Update 26 April 2022

Jan Newton, NANOOS Executive Director
Roxanne Carini, NANOOS Research Associate
Anna Boyar, NANOOS Staff

www.nanoos.org
Sea Surface Temperature Anomaly
NCDC Optimum Interpolation SST

September 2021
January 2022

Sea Surface Temperature Anomaly
NCDC Optimum Interpolation SST
Sea Surface Temperature Anomaly
NCDC Optimum Interpolation SST

NANOOS: www.nanoos.org Climatology app

February 2022
March 2022

Sea Surface Temperature Anomaly
NCDC Optimum Interpolation SST
NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly
OSU Modis

January 2022

February 2022

March 2022

Water Temperature Anomaly (°C)
NANOOS: www.nanoos.org Climatology app
NANOOS: [www.nanoos.org](http://www.nanoos.org) Climatology app

Sea Surface Temperature

- **NDBC Cape Elizabeth**: 34 yrs
- **NDBC Columbia River Bar**: 37 yrs
- **NDBC Stonewall Bank**: 34 yrs
- **NDBC Eel River**: 39 yrs

[Seasonal Cycle]
- -1 STD
- +1 STD
- +2 STD
- 2022

[Map with locations]
Sea Surface Chlorophyll Anomaly
OSU Modis

NANOOS: www.nanoos.org Climatology app
To summarize:

Temperature

- **Satellite – Pacific Basin:**
  - La Nina conditions continue
  - Heat in Gulf of AK abated starting in Oct
  - Warm anomaly shifts to western Pacific
  - Warm anomaly in NE Pacific decreased and became more diffuse Jan-Feb-Mar
- **Satellite – Coastal WA & OR:**
  - Oct-Jan: Predominantly cool anomalies offshore, warm anomalies onshore
  - Feb-Mar: Weaker and more mixed (warm/cool) anomalies
- **Buoys – Coastal:**
  - NDBC Washington: Cooler than average
  - Closer to shore NDBC: Depending on location, some slightly warmer than average in Jan, though most of 2022 average to cooler than average

Chlorophyll

- **Satellite – Coastal WA & OR:**
  - Jan-Feb: ocean color indicates highest biomass at the coast
  - Mar: ocean color indicates less than average biomass at the coast
Tracking Salish Sea Environmental Changes in Real-time

J. Mickett, J. Newton, N. Bond, B. Curry
NANOOS Environmental Metrics Website
www.nanoos.org/products/ps_metrics/home.php

Metrics

- Estuarine Flow
- Temperature Changes from Surface Heat Fluxes
- Salinity Changes from Rivers and Rain
- Water Column Dissolved Oxygen
- Ocean Boundary Conditions

Figure Archive

2021 Figure Archive
Ocean Boundary Conditions

- Cha’ba near surface
- Significant shelf changes that are correlated with and precede similar changes in Puget Sound are a potential indicator that source water changes are driving Puget Sound variability.
The Central and Northern California Ocean Observing System:
West Watch Update
Heat Content – Upper 100 m

- Uses West Coast ROMS 10 km now/hindcast
- Has NEMURO NPZ/BGC run associated with it
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 [Heat Index] warmer than the 90th percentile based on a [11-year] historical baseline period.”

WCOFS

https://data.caloos.org/#module-metadata/08776889-ee89-4d15-9b49-e0779ec1b0fb
Wave Tracker

Distribution of Wave Height, Past 30 Days
2022-04-26 00:00:00 to 2022-04-25 17:00:00

- Humboldt Bay (cdip 168)
- Cape Mendocino (cdip 094)
- Point Reyes (cdip 029)
- SF Bar (cdip 142)
- Monterey Bay (cdip 185)
- Cabrillo Point (cdip 158)
- Point Sur (cdip 157)
- Diablo Canyon (cdip 076)

Station Offline

https://www.cenkoos.org/information-solutions/recent-waves/
CA IFCB Network – MBARI Power Buoy

https://ifcb.caloos.org

Daniel, Kudela, Chavez, Ruhl, Anderson et al.
CA IOOS MPA Project & Data Products

- 122+ MPAs
- Climate variation
- Satellite data
- Model data
- C-HARM
- Seascapes
- EcoCast
- MPA monitoring
  - MARINe
  - PISCO
  - CCFRP
  - Reef Check
  - Ecotrust
  - ...


https://mpa-dashboard.caloos.org
- Refresh of app in use several years ago
- Multiplatform web app
- Leverages PORTS/SFBOFS
- Other layers under consideration including navigation charts
- Available now
- Launch communications immanent

https://apps.apple.com/us/app/baycurrents/id1591997070
NOAA West Watch Webinar: Southern California
Clarissa Anderson, SCCOOS Executive Director
26-Apr 2022
SCCOOS Automated Shore Stations

Sea Surface Temperature Anomalies

- SCCOOS shore stations ~ 17 years of data
- Ocean temps have been cooler for ~8 months
- Now trending near normal, except in areas affected by upwelling

https://data.caloos.org/
Coastal Data Information Program (CDIP)

West Coast wave activity in 2022 has been following the long term climate trend.
- Notable swell events in early January and early April for PNW.
- Publishing wave bulletins based on CDIP observations.

West Coast sea surface temperatures (SST) also following the climate trend.
- Some stations north of Pt. Conception were cooler than average but trending near normal now.
- Warming in N. SD and LA in early April but trending near normal now overall.
- Recent upwelling in SoCal has brought record cold waters near shore in CDIP stations.

CDIP 045 Oceanside SST
CDIP 139 Umpqua Hs
CDIP 179 Astoria Canyon SST

Wave bulletins:
http://cdip.ucsd.edu/themes/cdip?d2=p12

J. Behrens, SIO
California Underwater Glider Network

- Decadal scale changes in salinity
- Recent salty period starting in 2018 offshore- suggests initial influx came southward in the CA current
- Inshore 2015-2016 salty blob indicates strong El Niño with northward flow of salty water in the CA undercurrent
CA IFCB Network - progress update

Roll out of stations:
- San Francisco Pier 17
- Santa Cruz Wharf
- MBARI Power Buoy
- Stearns Wharf
- Newport Beach Pier
- Del Mar Mooring
- Scripps Pier

Mosaic from March 16 illustrates the latitudinal and environmental variation in species

https://ifcb.caloos.org/dashboard
Akashiwo sanguinea boom currently occurring at Newport Beach Pier

https://ifcb.calcoos.org/dashboard
Harmful Algal Bloom Monitoring Alert Program (HABMAP)
The Pacific Marine Mammal Center (PMMC), in Laguna Beach, recorded a mass sea lion stranding event in February-March.

Domoic acid analysis pending but appears to be caused by an offshore DA event.


California Ocean Observing Systems Science Impact and Stakeholder Engagement Meeting
Hosted by SCCOOS & CeCOOOS
May 23rd - 25th, 2022
Avila Lighthouse Suites
550 Front St, Avila Beach, CA
Point San Luis Conference Room
Register by APRIL 15TH

Meeting Objectives:
1. Provide an update of California’s Ocean Observing System’s accomplishments, DMAC capabilities, and end-user applications.
2. Improve strategic alignment among Cal OOS contributing partners and share advancements in scientific understanding.
3. Identify knowledge gaps and stakeholder needs

Meeting Organization:
Scientific Presentation
- State of the Science
- Observing Subsystems - Success and Challenges, New Findings
- Data Management
- Highlight Products/Tools

Stakeholder Discussion:
- Are there stakeholder needs/gaps that Cal OOS can help fill? What additional information could improve your ability to meet your priorities?
- What do you like about the current data products provided and what would you like improved?
- What opportunities are there for cross-collaboration?
- How to improve DEI and support tribal monitoring efforts?

Questions?
info@sccoos.org

https://data.caloos.org/
Next NOAA West Watch:

August 2, 2022

Thanks!

Photo: Tahoe Rim Trail, October 7, 2021
Credit: Dan McEvoy