



# NOAA West Watch

## *Reporting Regional Environmental Conditions & Impacts in the West*

January 25, 2021



# Call Agenda

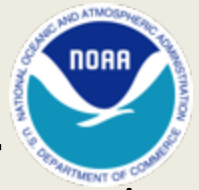
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- **Project Recap & Updates (Dan McEvoy)**
- Regional Climate and ENSO brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Jan Newton, Alex Harper, Megan Hepner-Median, Ross Timmerman)
- Discussion - Environmental conditions and impacts reporting (All)
  - Additional impacts to share?

# Project Recap and Updates

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- NOAA West Watch webinars are run by the Western Regional Climate Center, in partnership with the NOAA Western Regional Collaboration Team (NOAA West) with 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.

# Project Recap and Updates

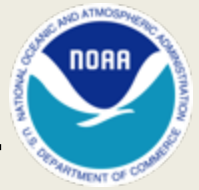
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- The Western Regional Climate Center has agreed to provide funding to support continued quarterly webinars in 2021 and will be reassessed again at the end of the year.
- Request: If you find these webinars helpful, or if you have ideas of in-region entities that may be open to taking on this webinar please let me know: (mcevoyd@dri.edu).

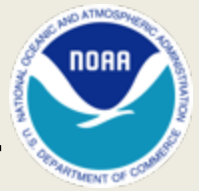
# Call Agenda

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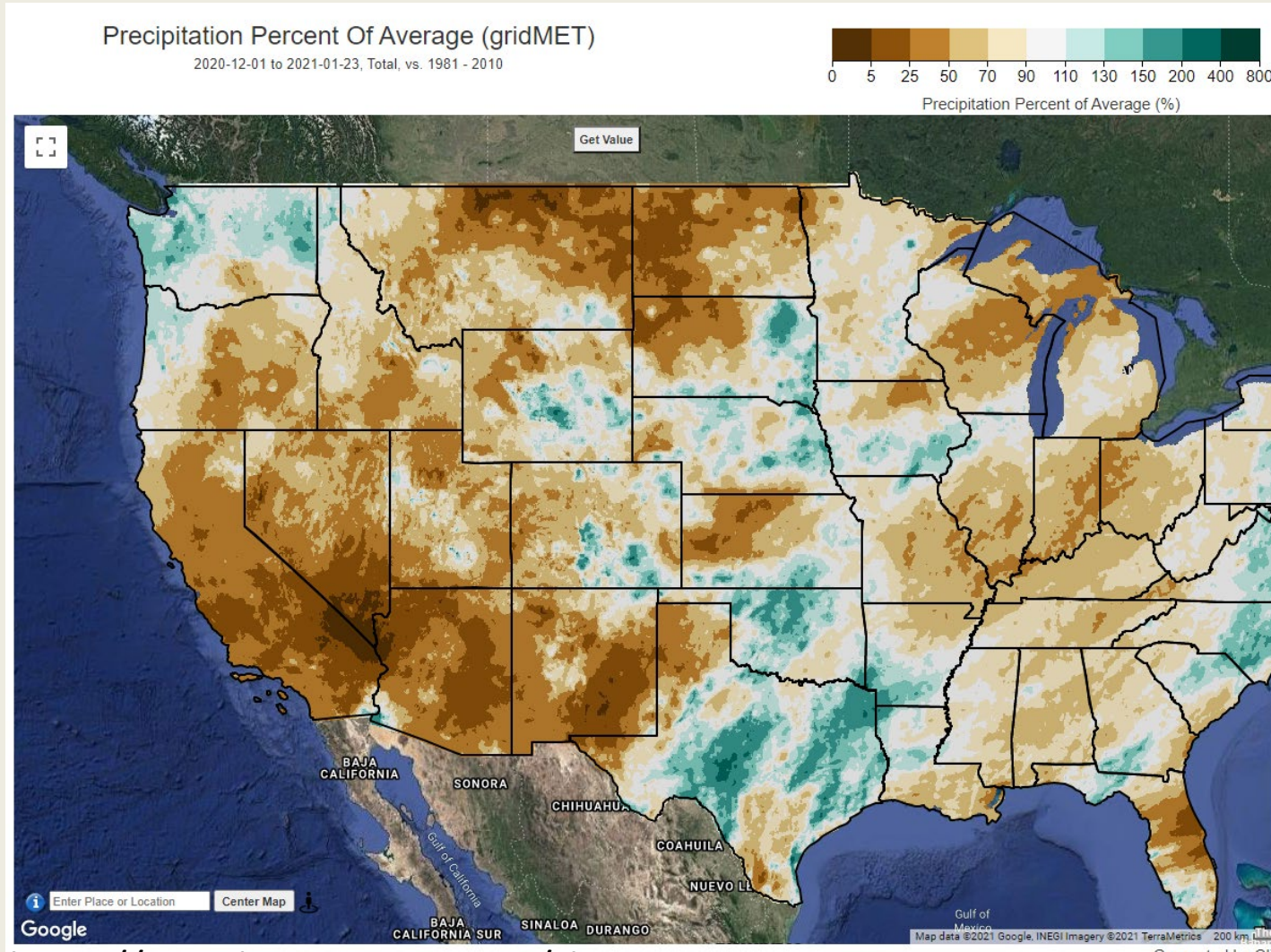


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# Winter 2020/2021 Precipitation

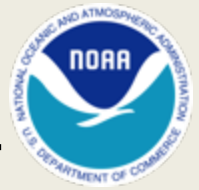


## December 1-January 23 Percent of Average

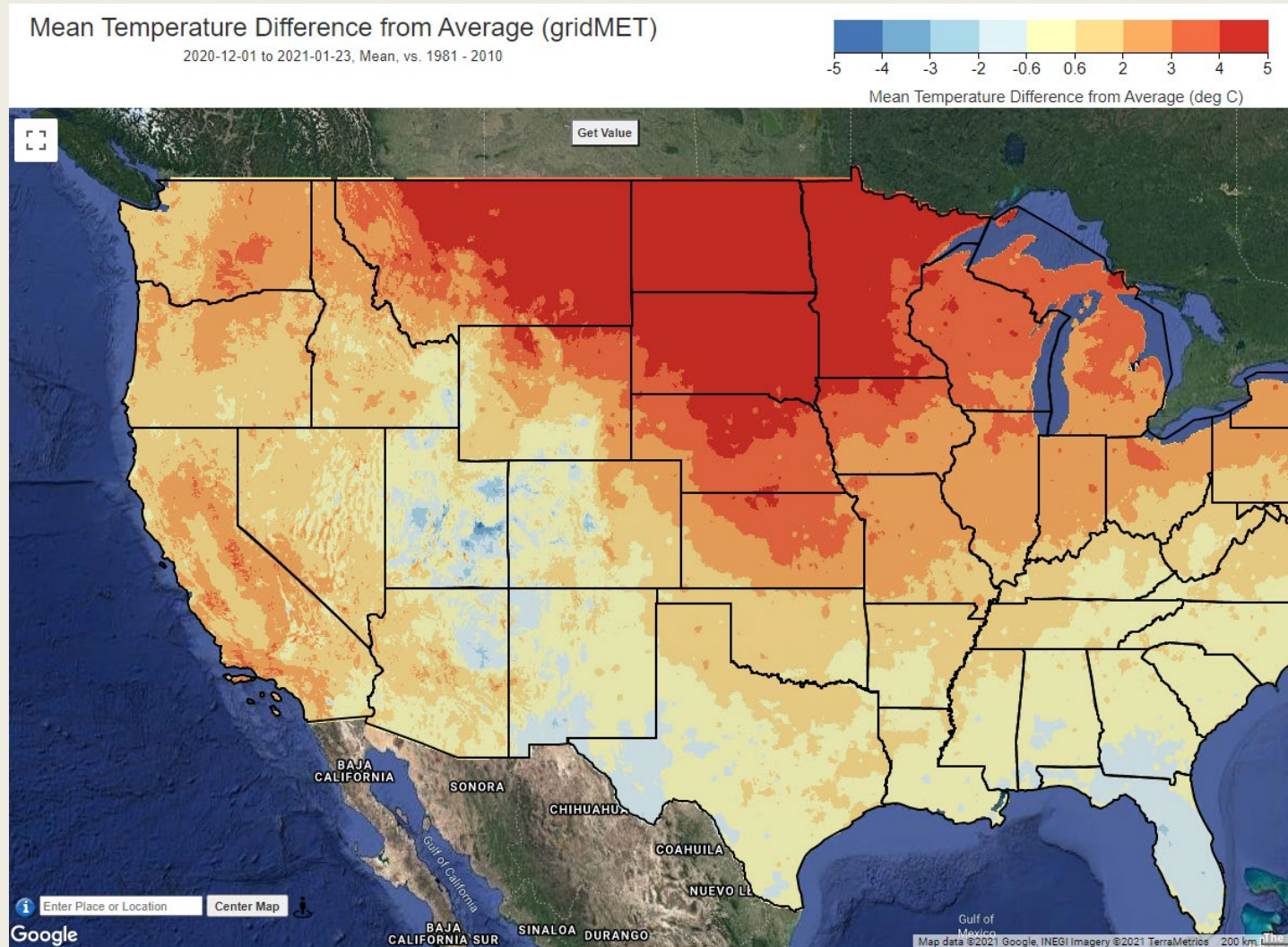


<https://app.climateengine.org/climateEngine>

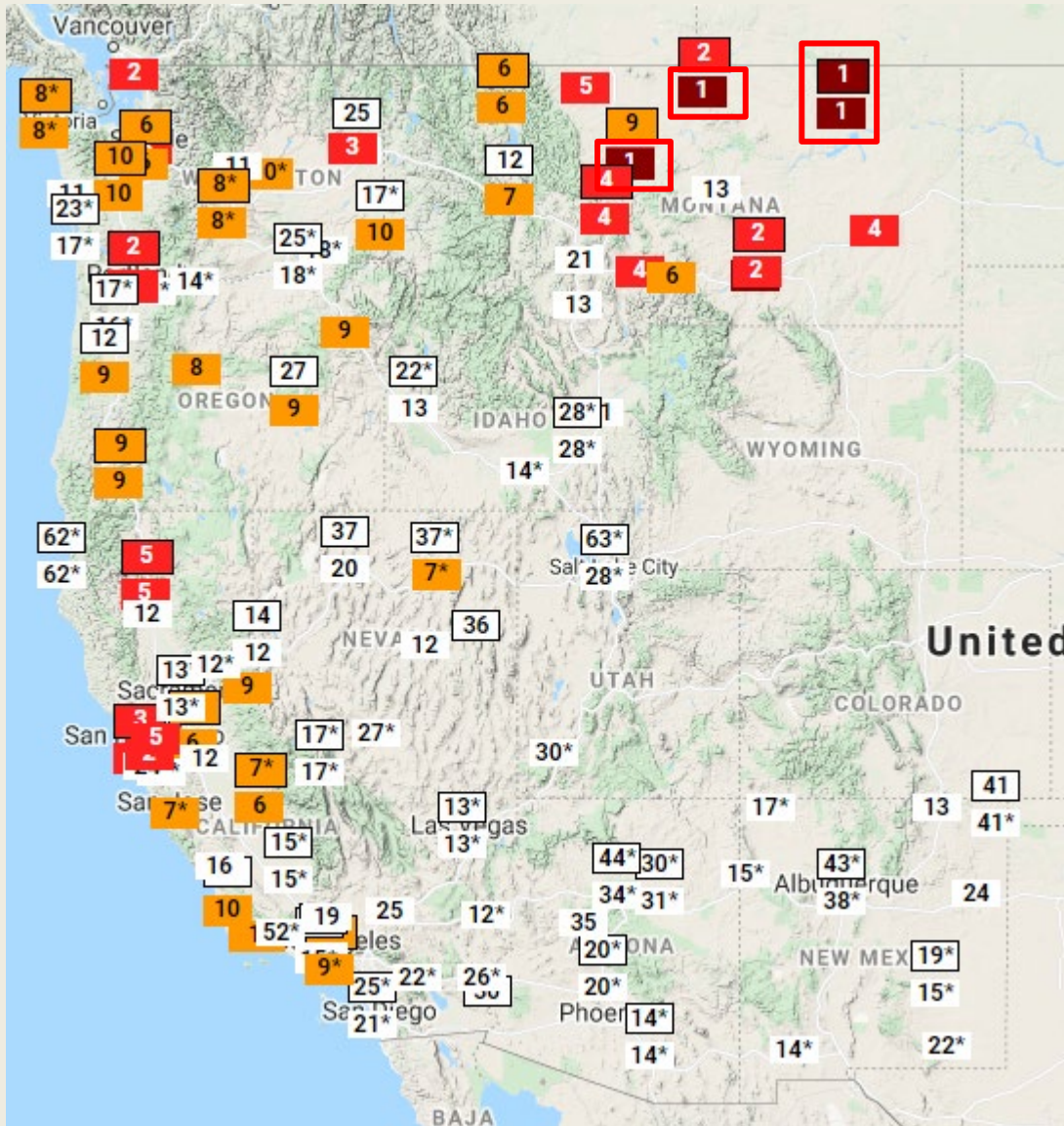
# Winter 2020/2021 Temperature



## December 1-January 23 Mean Temperature Departures



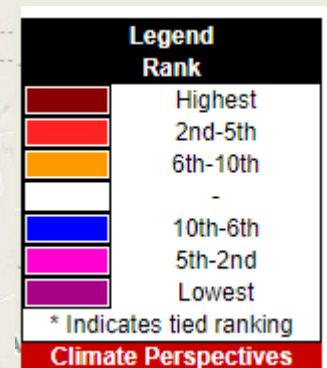
# Winter 2020/2021 Temperature



December 1-January 25  
 Mean Temperature  
 Rankings at stations

Record warmth in parts  
 of Montana

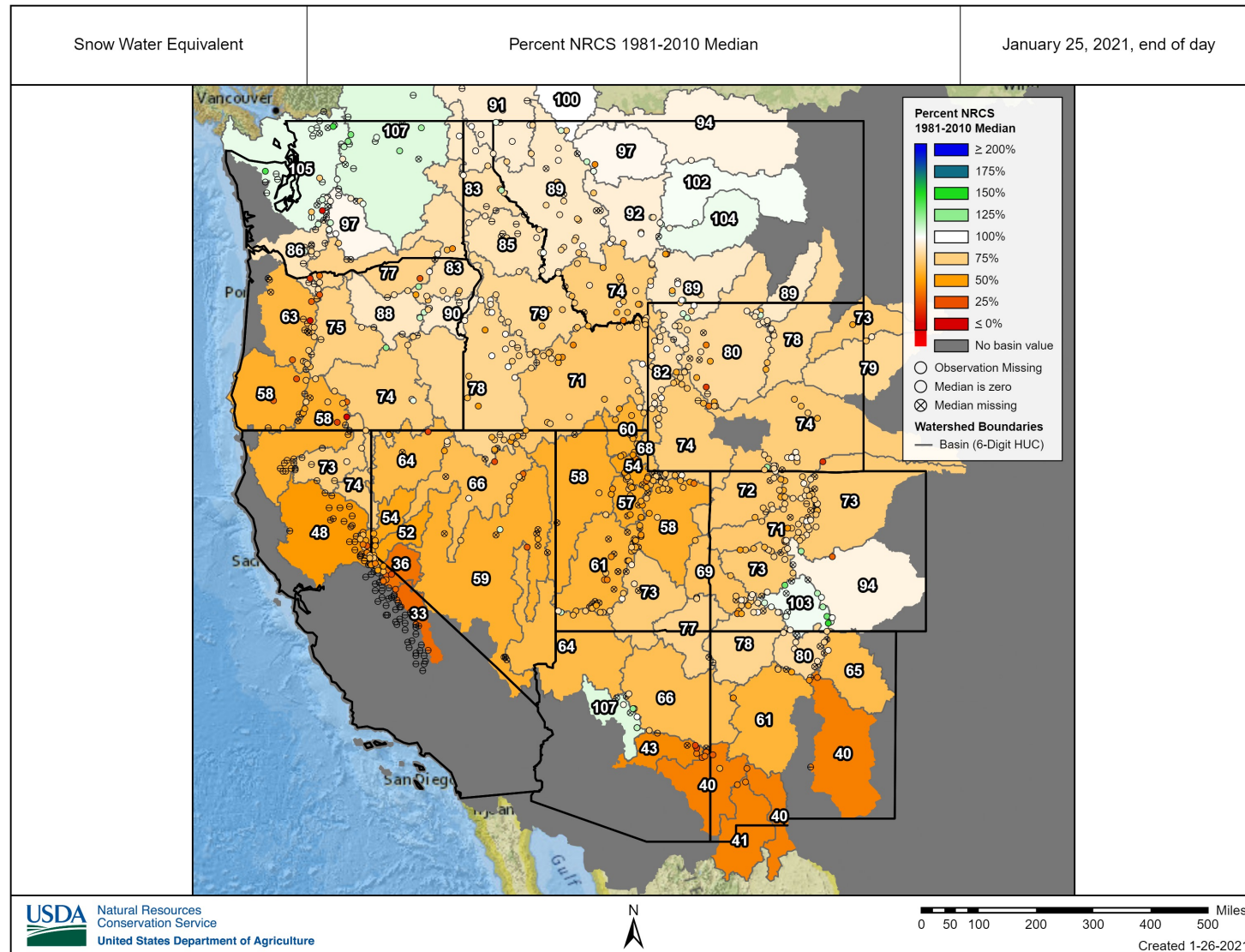
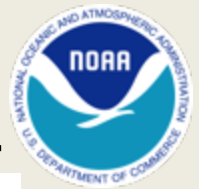
Widespread top 2-10  
 warmest starts to winter



<https://sercc.com/perspectivesmap?region=wrcc>



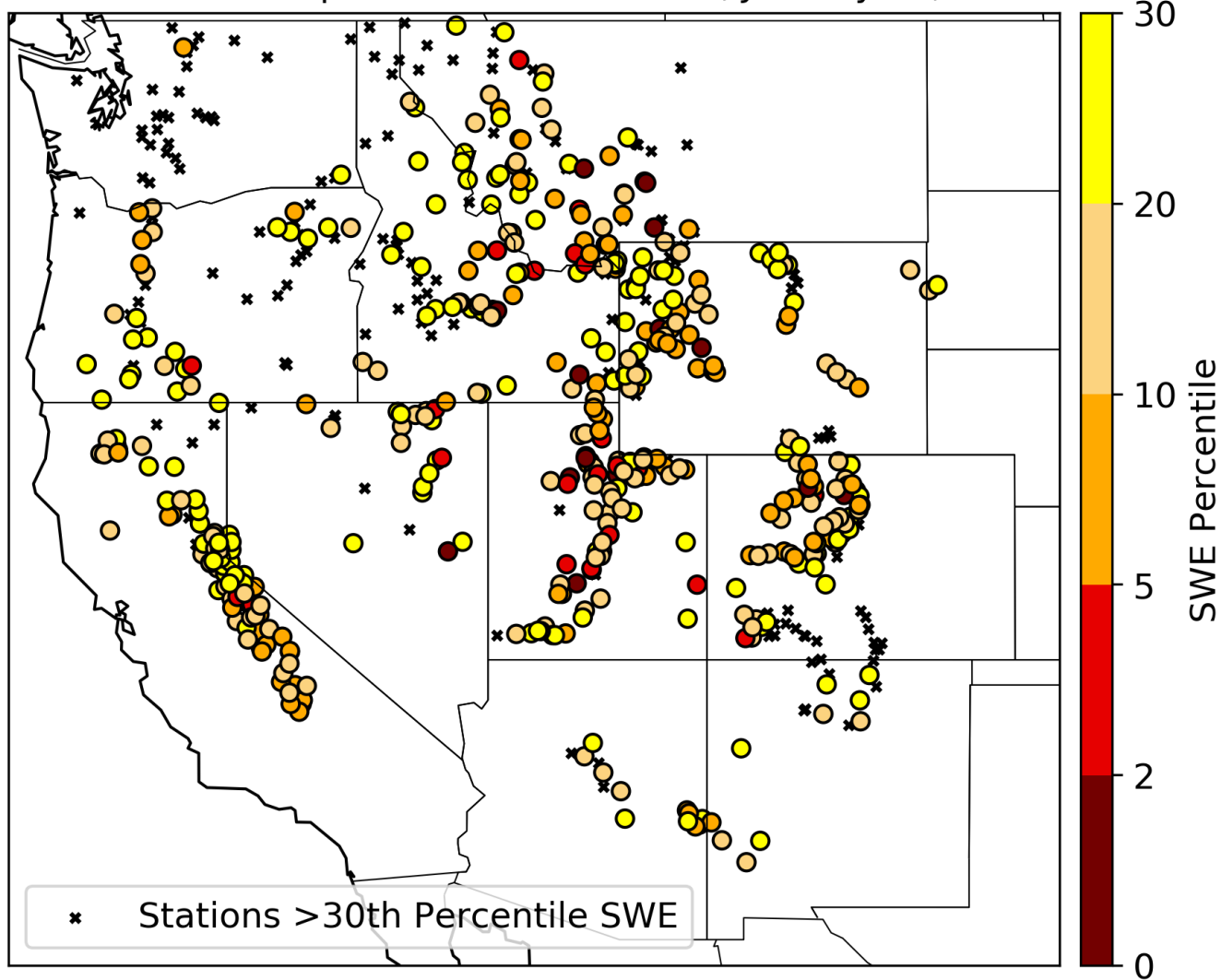
# Western US Snow Drought



# Western US Snow Drought

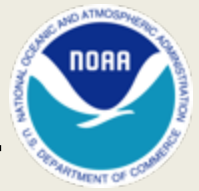


SNOTEL and Cooperative Snow Sensors, January 24, 2021



Data: [https://www.wcc.nrcs.usda.gov/snow/snow\\_map.html](https://www.wcc.nrcs.usda.gov/snow/snow_map.html)

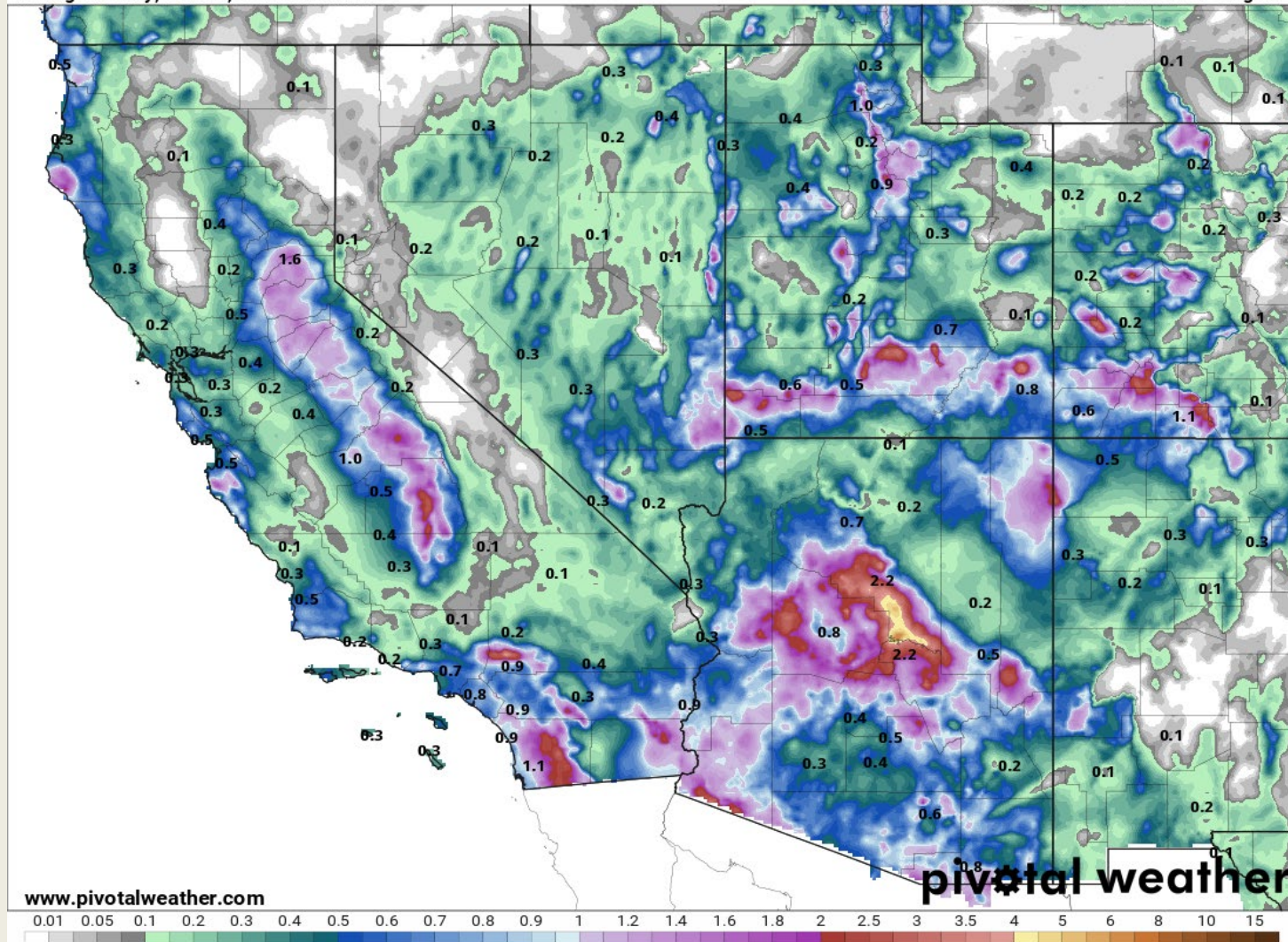
# Beneficial rain and snow in the Southwest



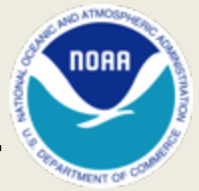
## 7-day precipitation totals ending 4 a.m. today

168-Hour Stage IV Precipitation Analysis (in)  
Ending Tuesday, Jan. 26, 2021 at 4 a.m. PST

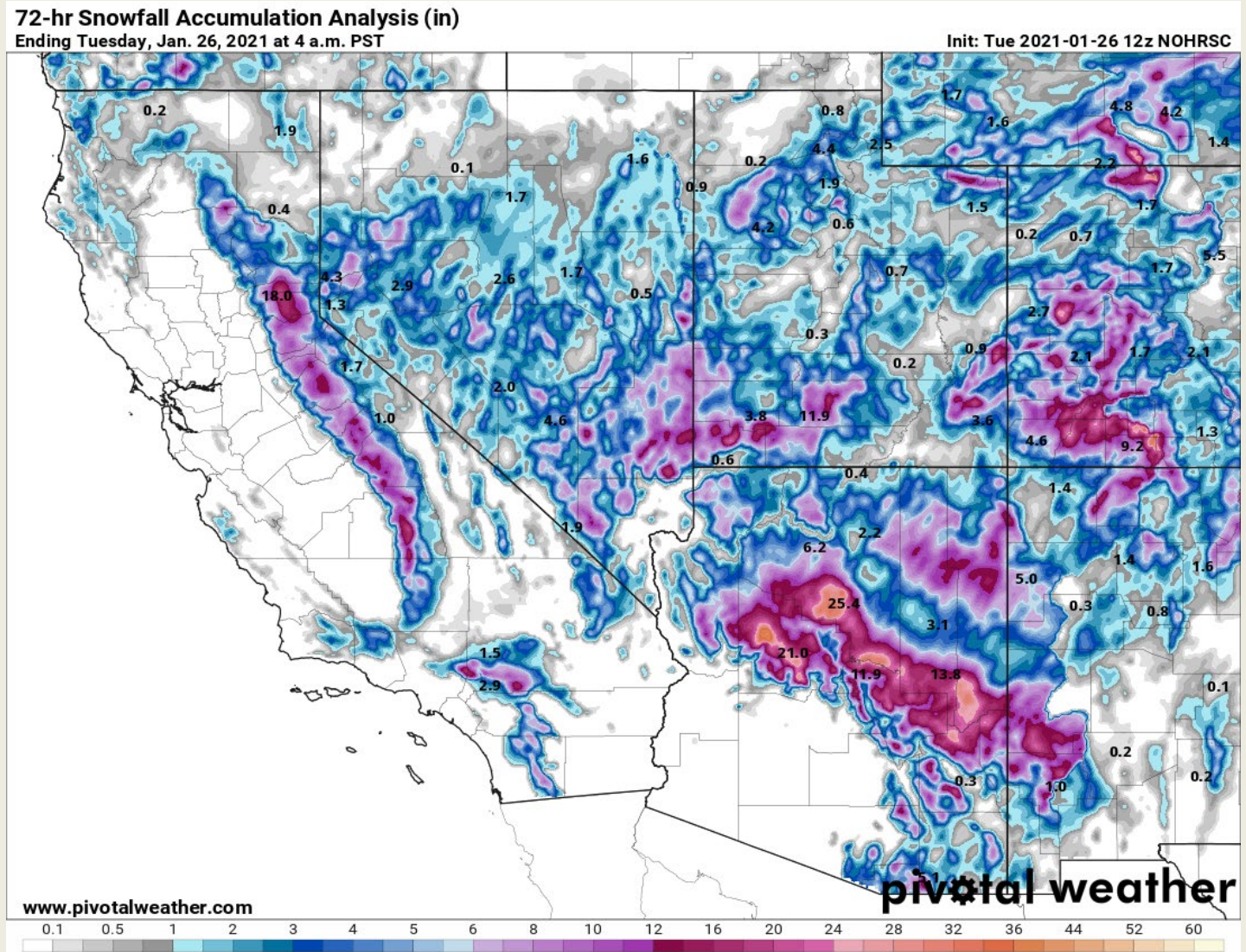
Init: Tue 2021-01-26 12z NCEP Stage IV



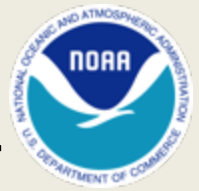
# Beneficial rain and snow in the Southwest



## 72-hour snowfall totals ending 4 a.m. today

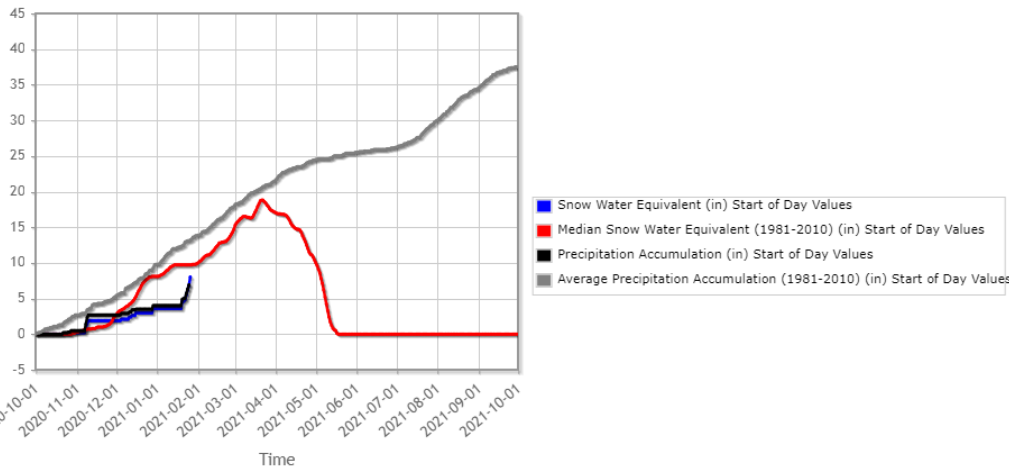


# Beneficial rain and snow in the Southwest



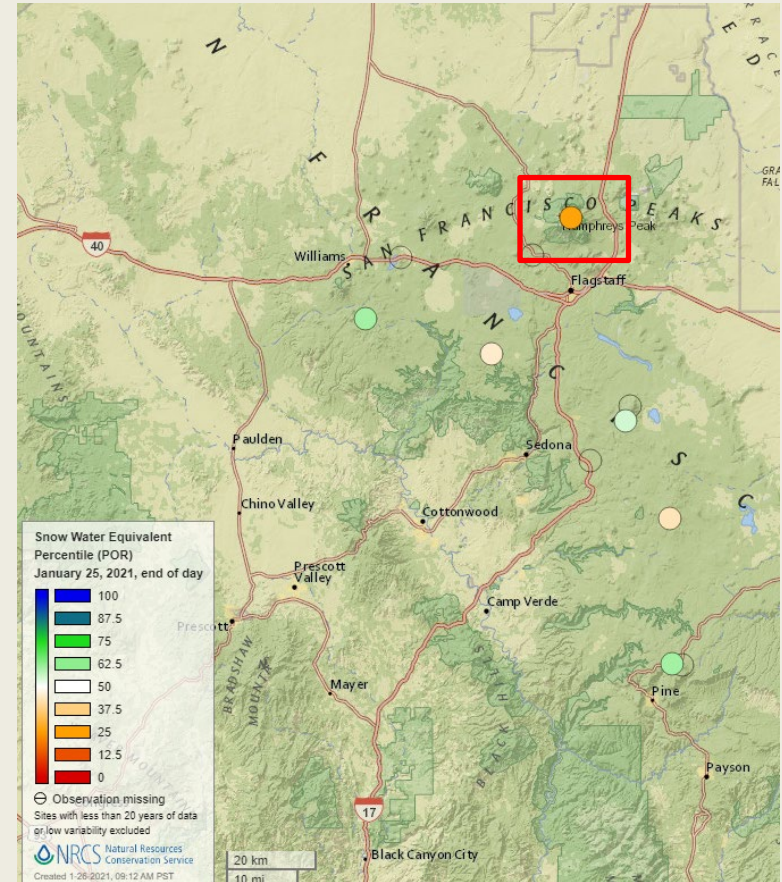
## Snowslide Canyon, AZ SNOTEL

Snowslide Canyon (927) Arizona SNOTEL Site - 9730 ft Reporting Frequency: Daily; Date Range: 2020-10-01 to 2021-09-01

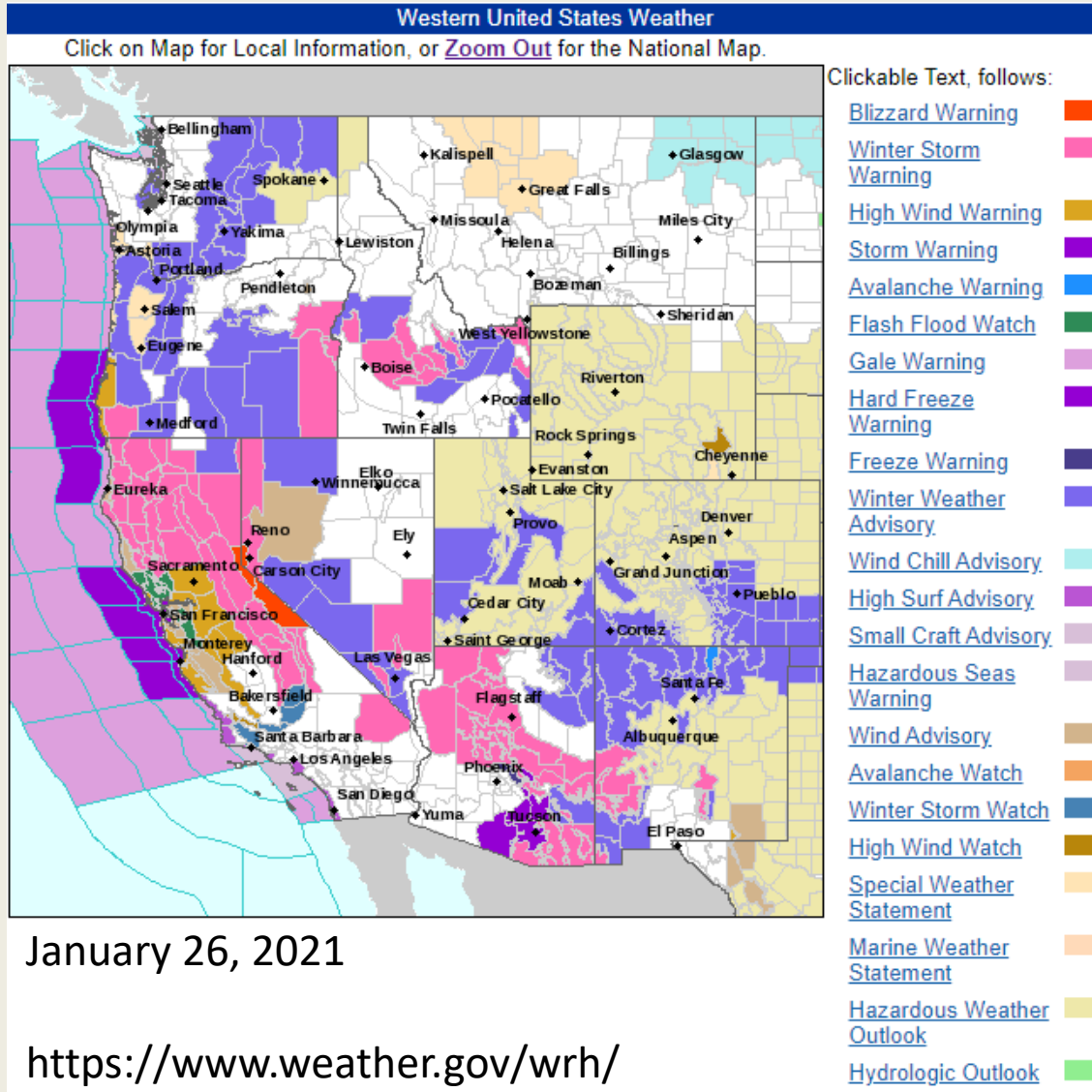
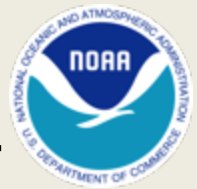


January 20-26:  
2.9" accumulated precipitation (1 day missing)

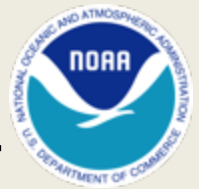
4.4" increase in snow water equivalent



# Major storm to impact Western US



# Extreme Sierra Nevada Snowfall

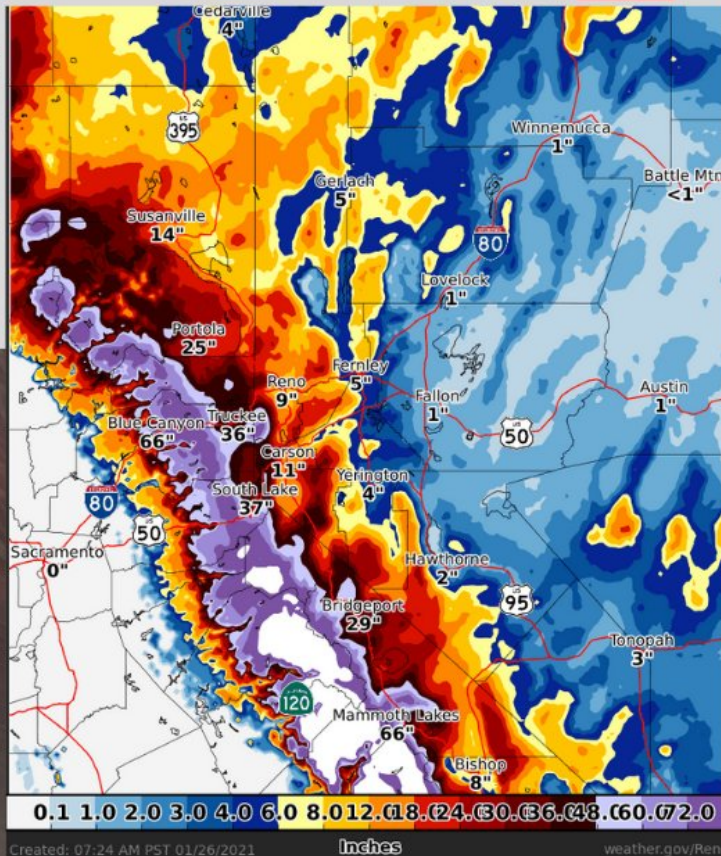


## **BLIZZARD WARNING**



### **Tuesday Night - Friday Morning**

- Do Not Attempt to Travel
- Very Heavy Snowfall
- High Winds & Potential Power Outages
- Mountain Whiteout Conditions & Extreme Avalanche Danger



Warning has a 54-hour duration!

10 pm Tuesday to 4 am Friday



**PLAN FOR  
WHITEOUT  
CONDITIONS**

Photo: CHP Truckee

Created: 07:24 AM PST 01/26/2021 weather.gov/Reno

 **WEATHER.GOV/RENO**

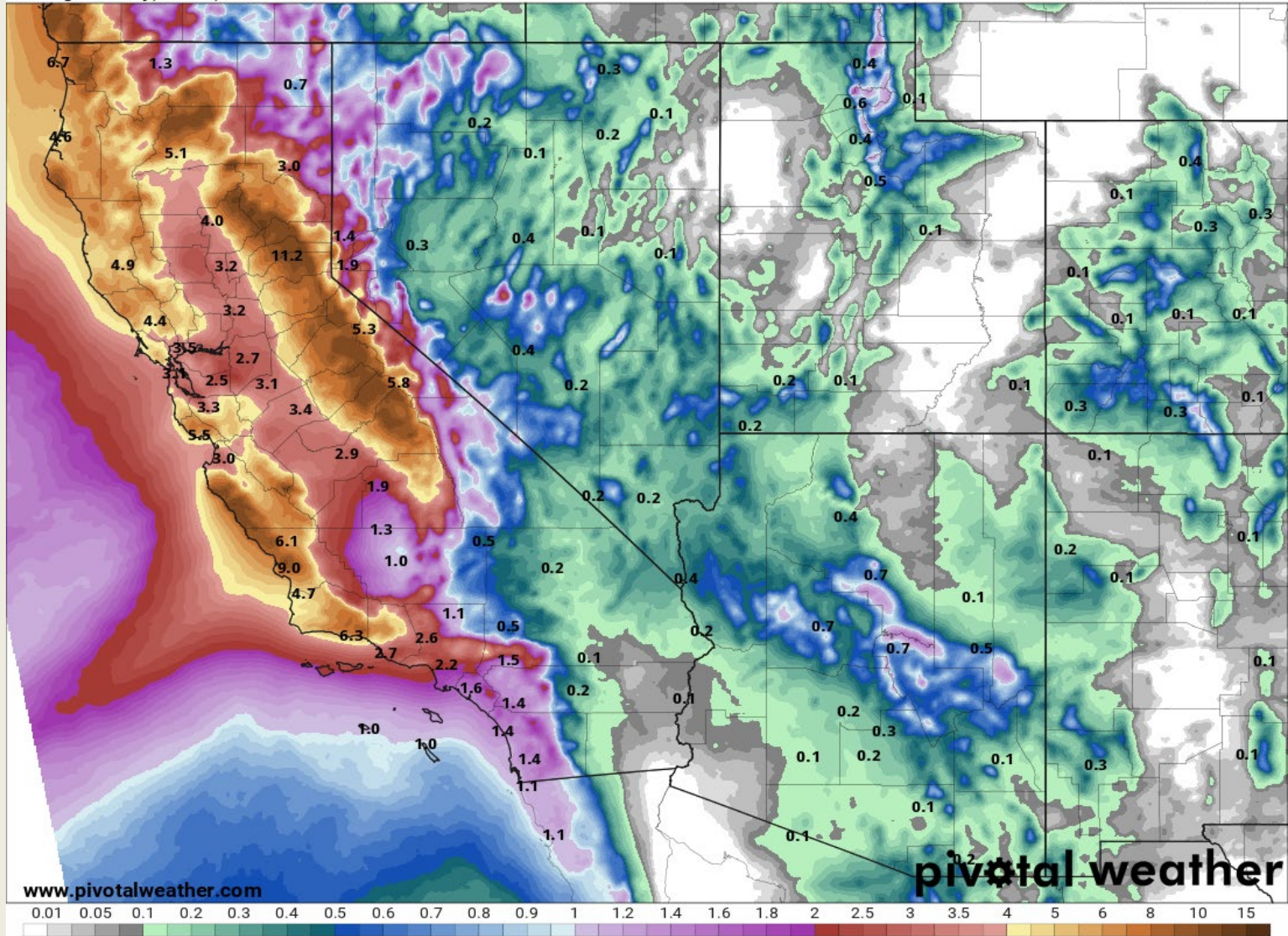
# Drought Buster??



## 7-Day Precipitation (in)

Ending Tuesday, Feb. 2, 2021 at 4 a.m. PST

Init: Tue 2021-01-26 12z WPC



www.pivotalweather.com

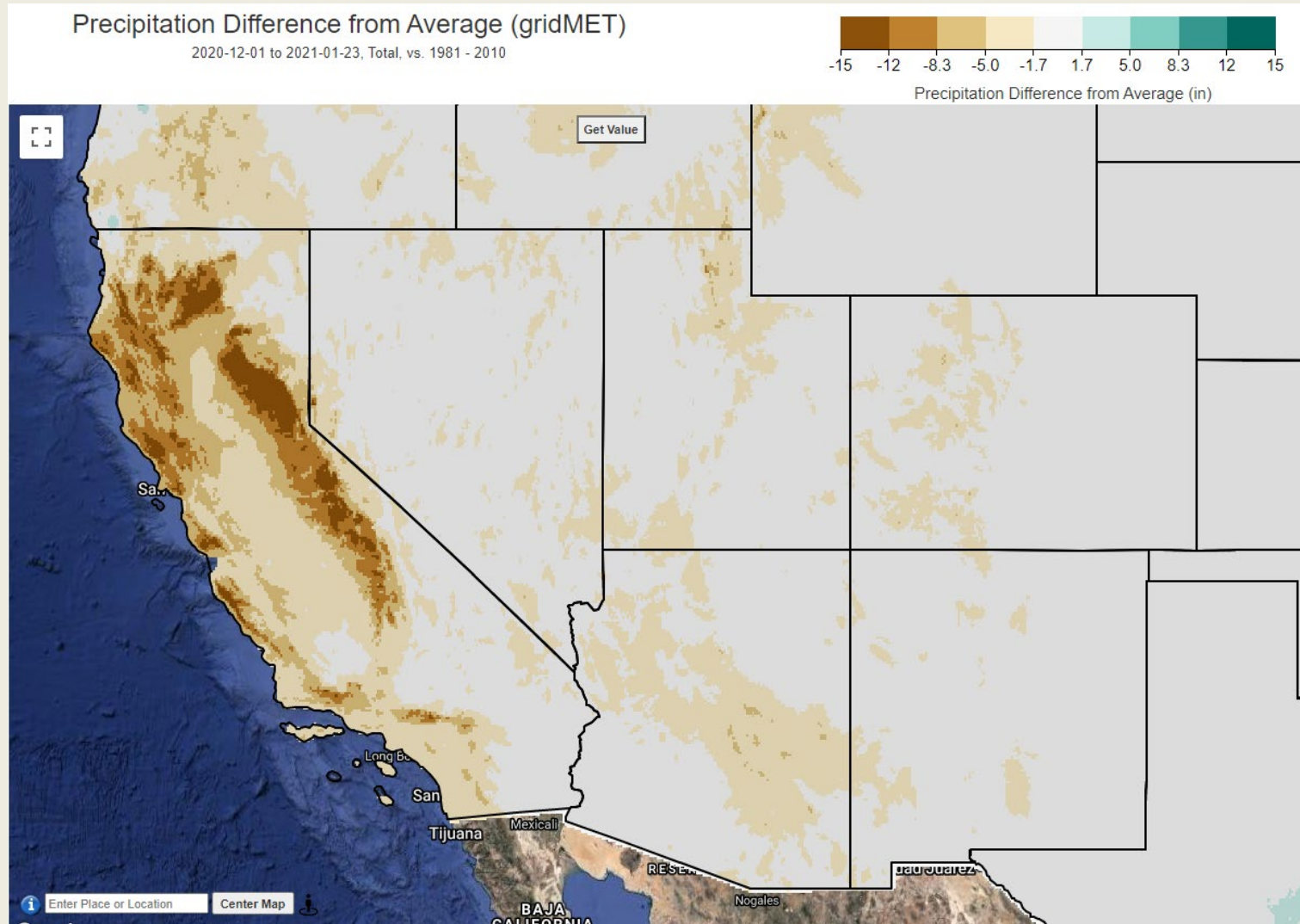
pivotal weather



# Drought Buster??



## December 1-January 23 Precipitation Deficit (inches)



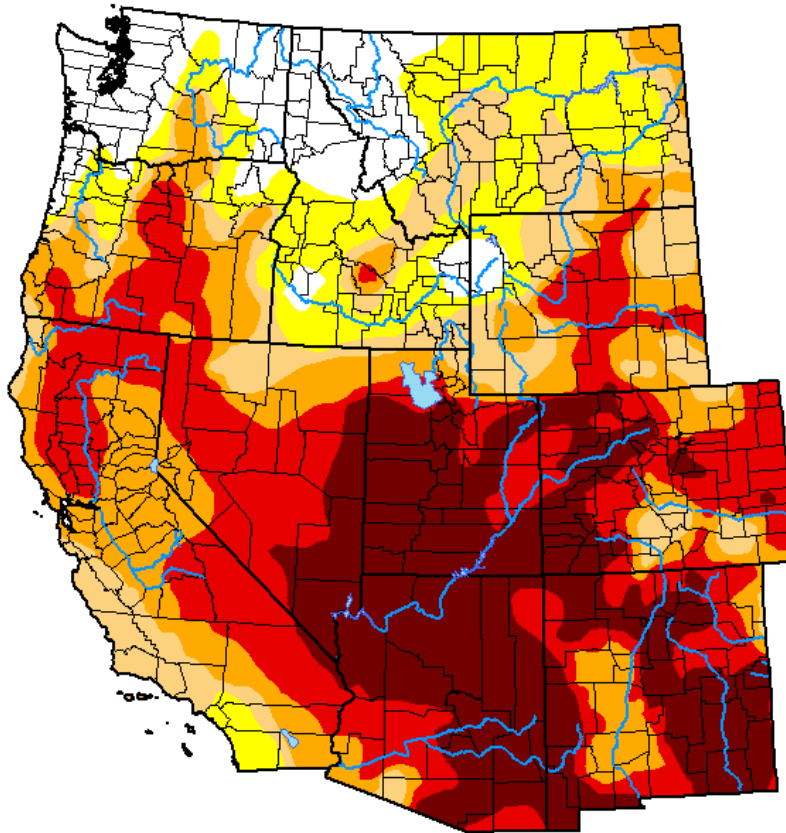
# Drought Buster??









## U.S. Drought Monitor West

January 19, 2021  
(Released Thursday, Jan. 21, 2021)  
Valid 7 a.m. EST

*How much will this map change by the end of next week?*



Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>*

Author:

Richard Tinker  
CPC/NOAA/NWS/NCEP



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)



## ENSO Alert System Status: **La Niña Advisory**

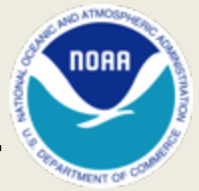
- La Niña conditions are present.\*
- Equatorial sea surface temperatures (SSTs) are below average from the west-central to eastern Pacific Ocean.
- The tropical atmospheric circulation is consistent with La Niña.
- La Niña is expected to continue through the Northern Hemisphere winter 2020-21 (~95% chance during January-March), with a potential transition to ENSO-neutral during the spring 2021 (55% chance during April-June).\*

Credit: CPC

\* Note: These statements are updated once a month (2<sup>nd</sup> Thursday) in association with the ENSO Diagnostics Discussion, which can be found here:

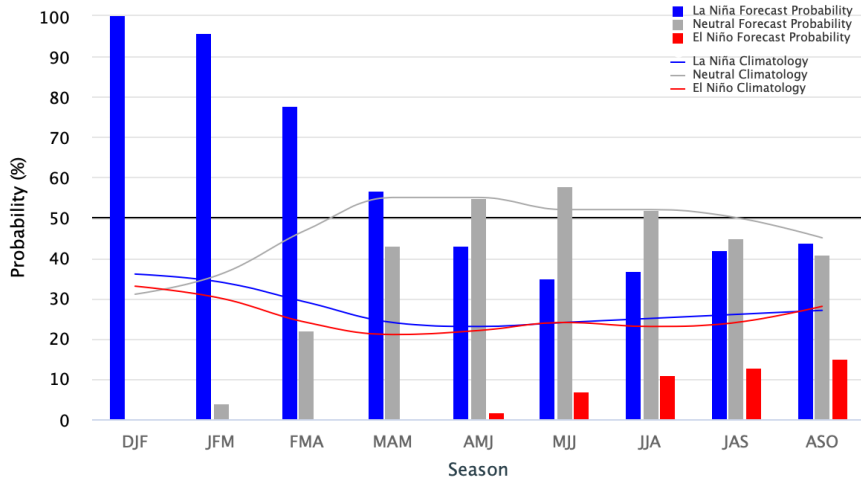
[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/).

# ENSO Forecasts



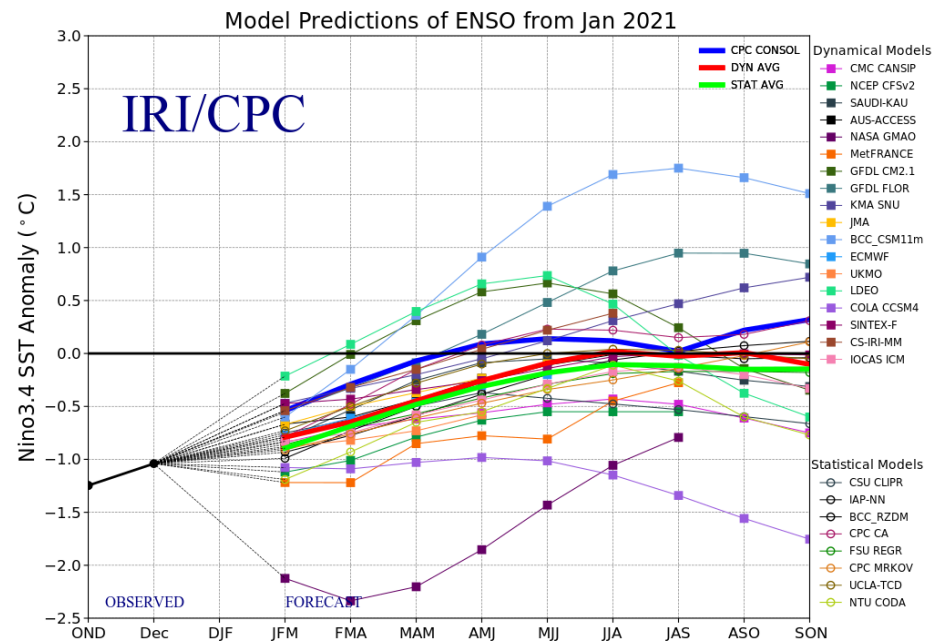
Early-January 2021 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly  
Neutral ENSO: -0.5 °C to 0.5 °C

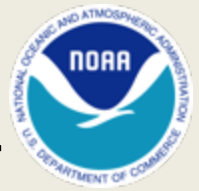


CPC/IRI El Niño forecast:

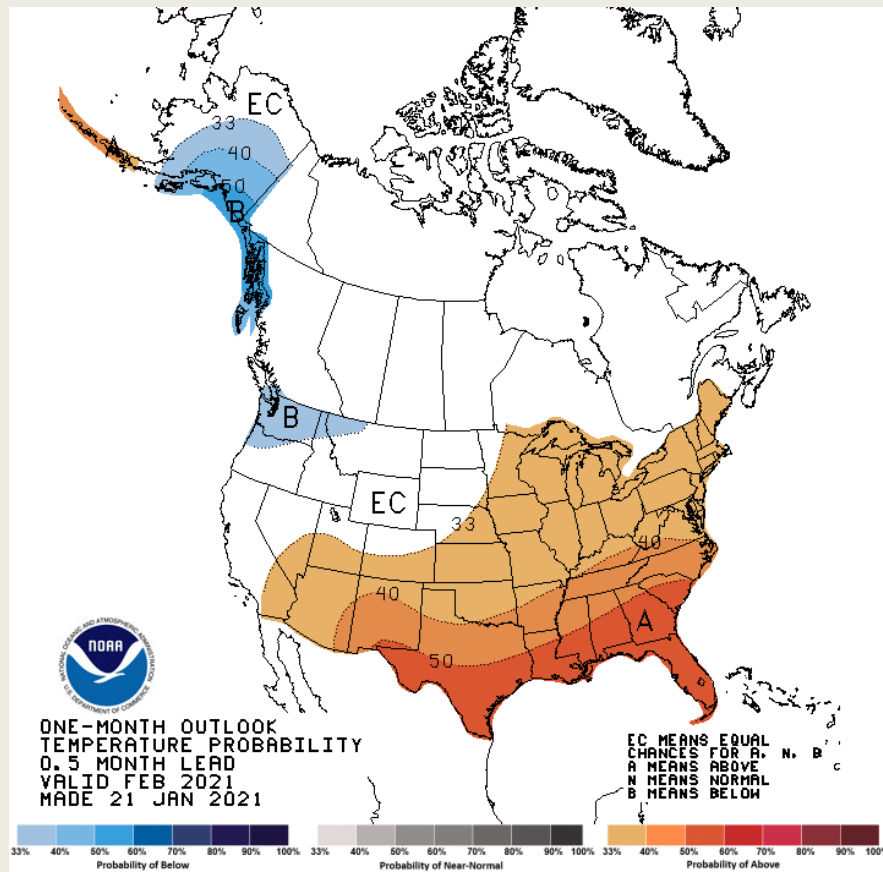
NMME models + other dynamical models + statistical models



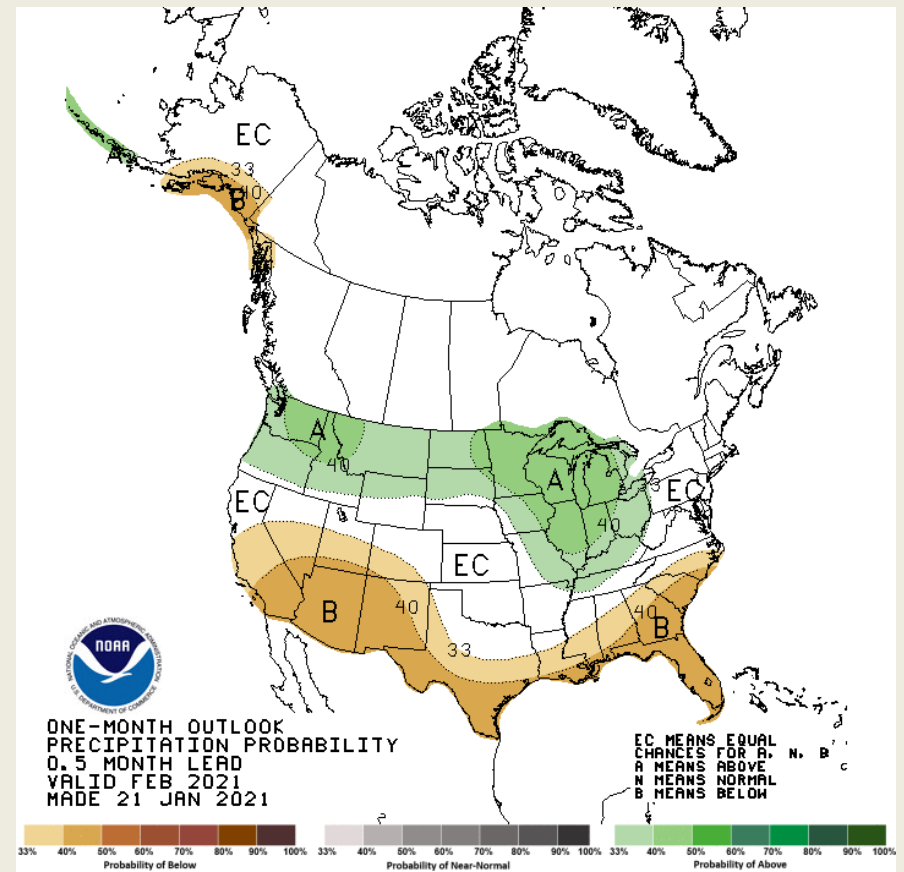
# February 2021 Outlook



## Temperature Probability

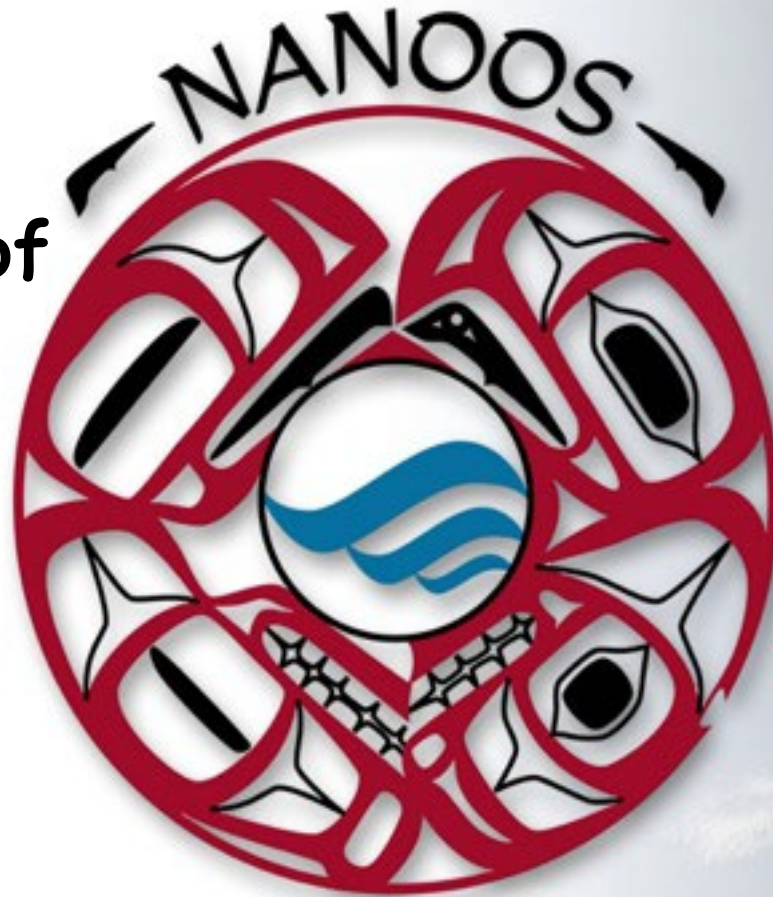


## Precipitation Probability



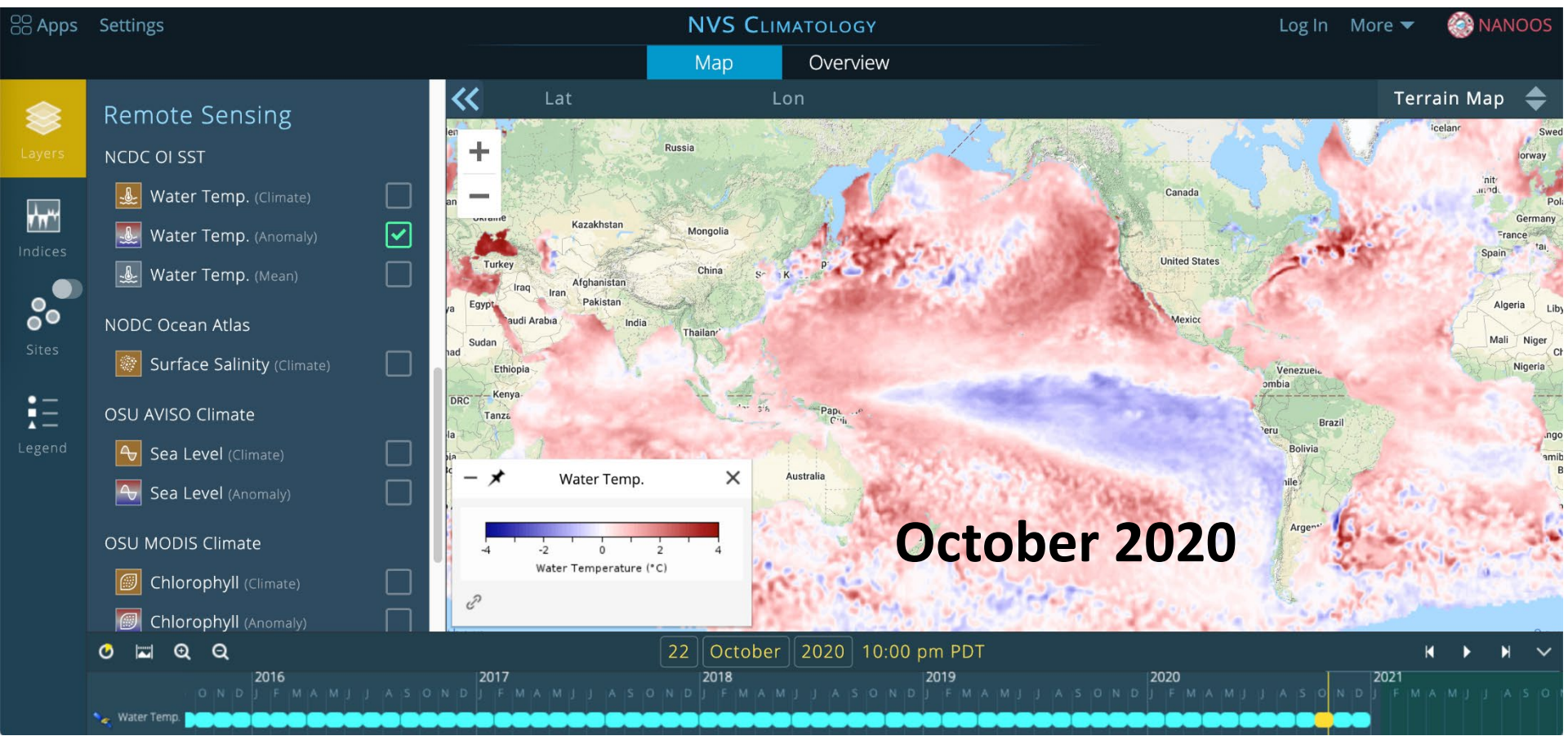
Source: NOAA/CPC

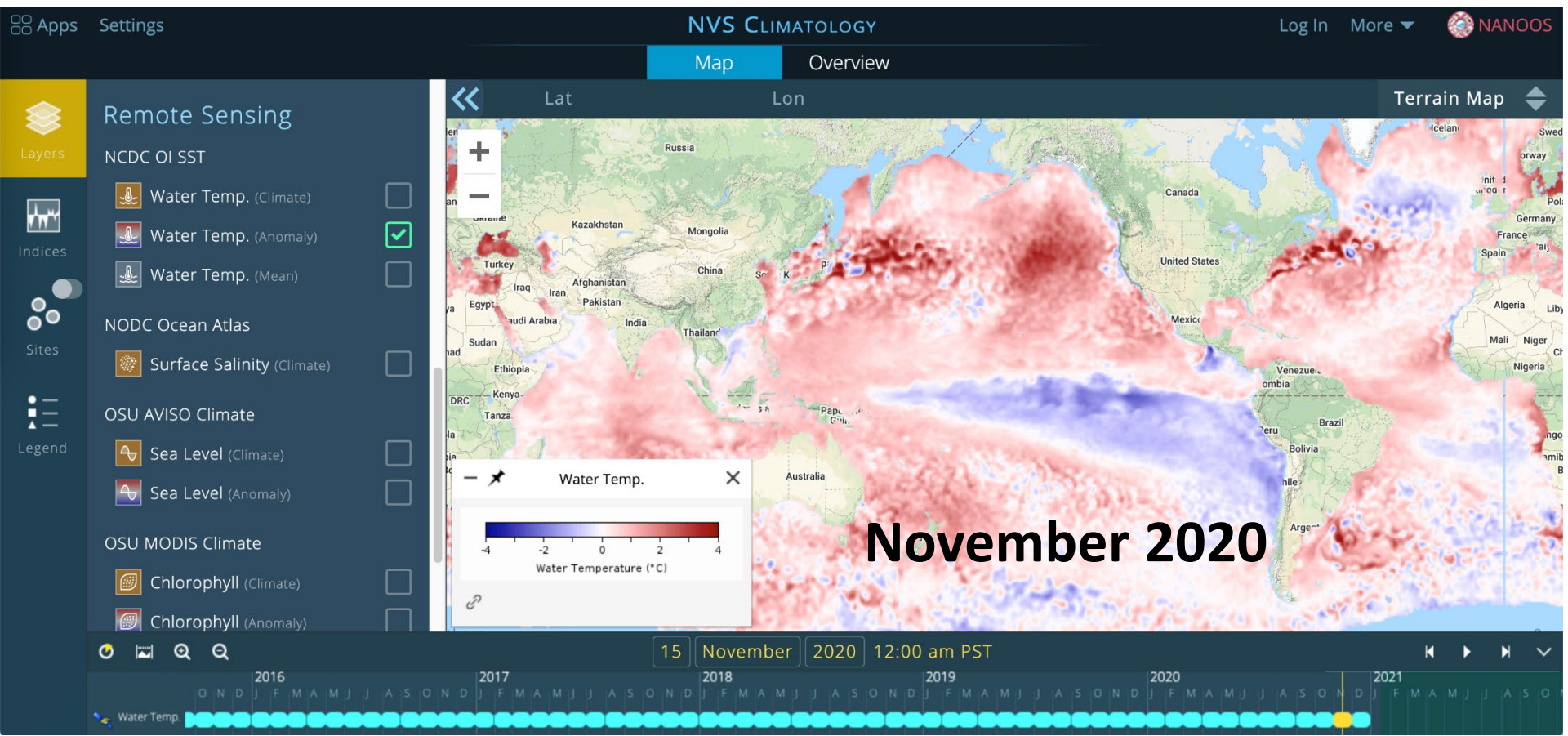
**Northwest  
Association of  
Networked  
Ocean  
Observing  
Systems**



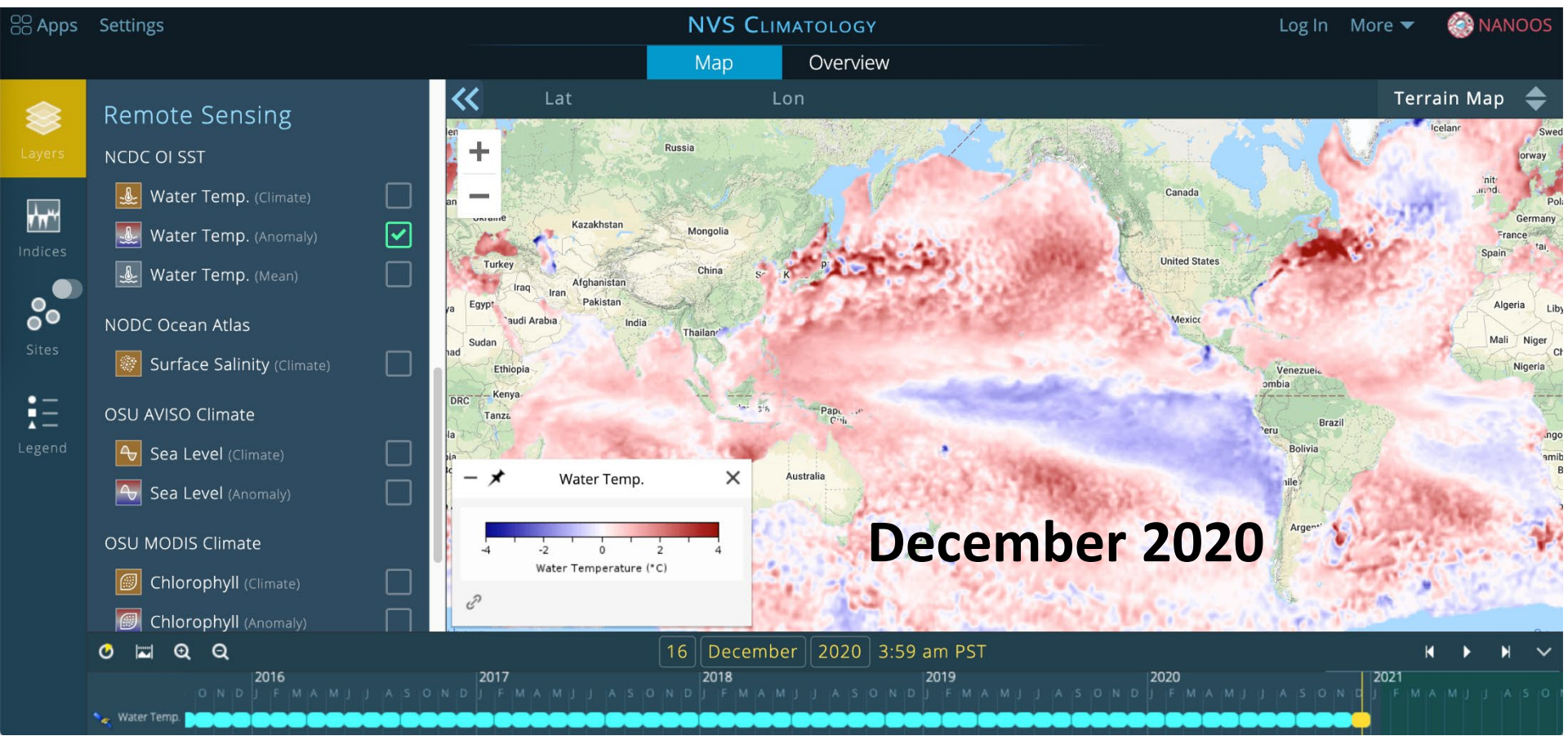
**NOAA West Watch Update 26 January 2021:  
Washington / Oregon Observations**

*Jan Newton, NANOOS Executive Director*

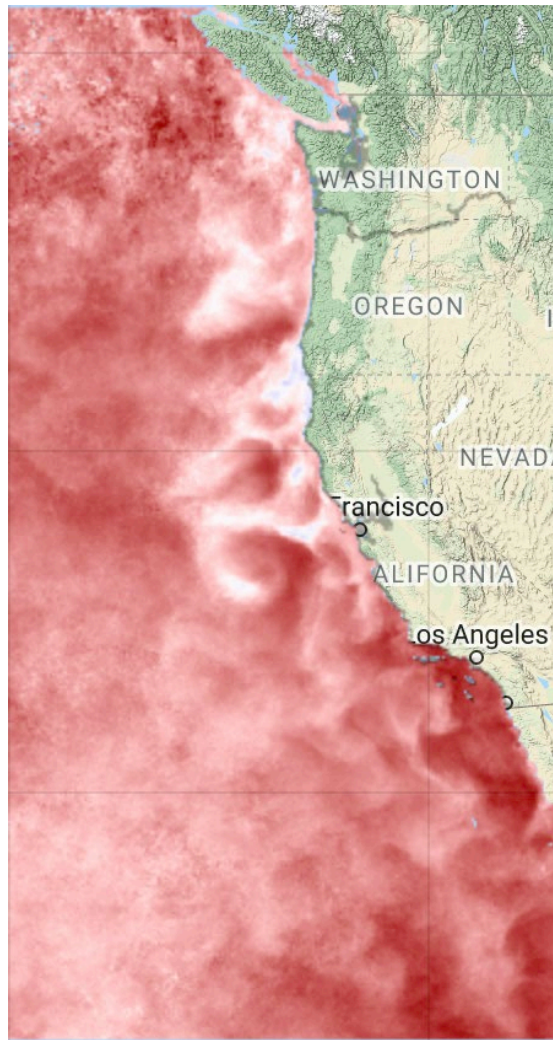




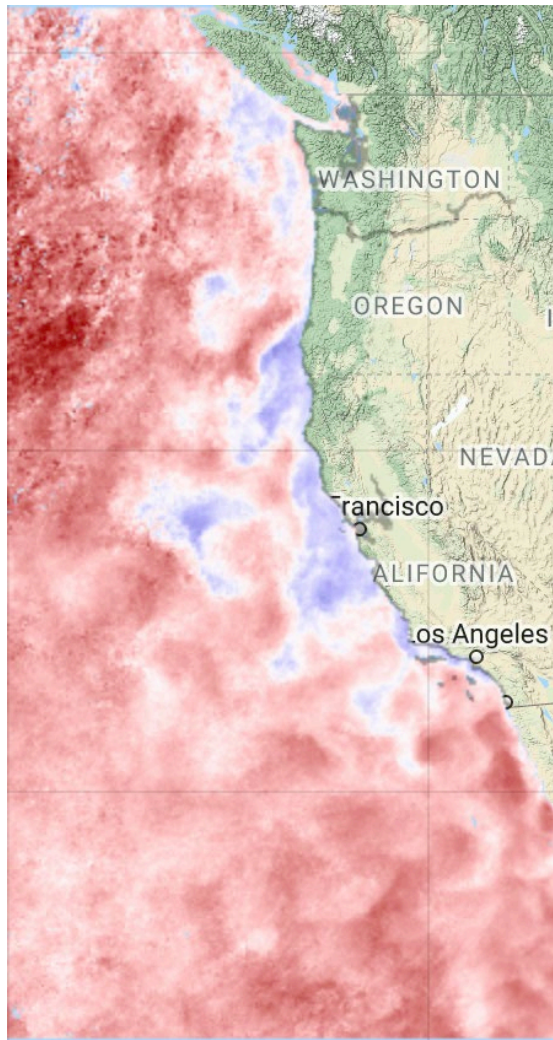




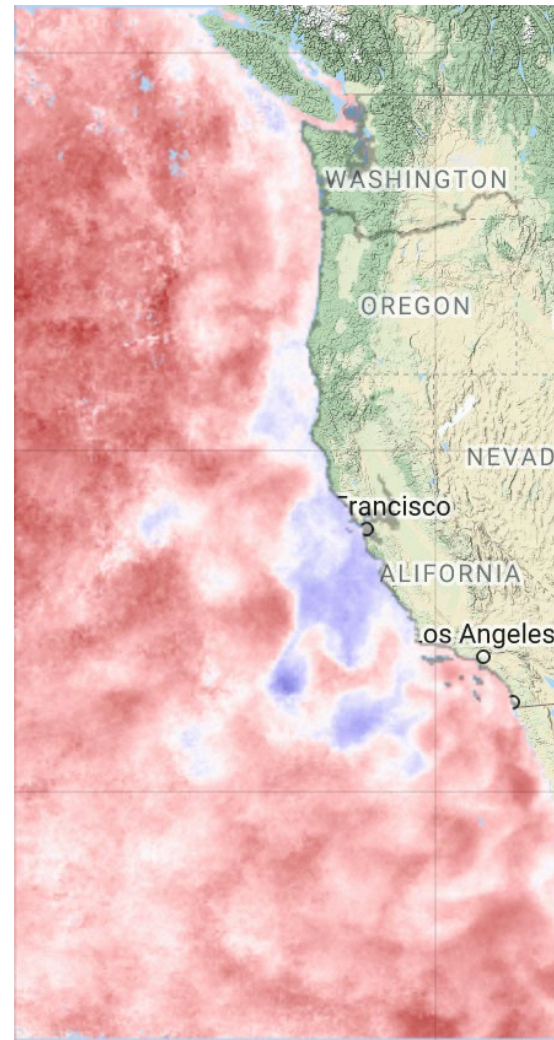
October 2020



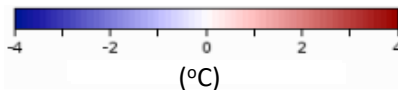
November 2020



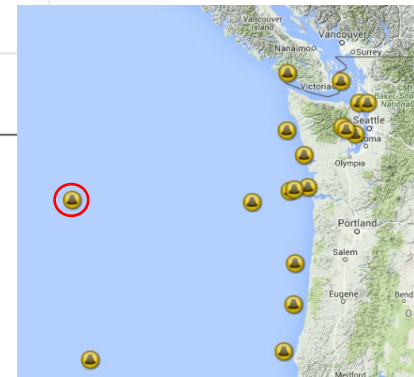
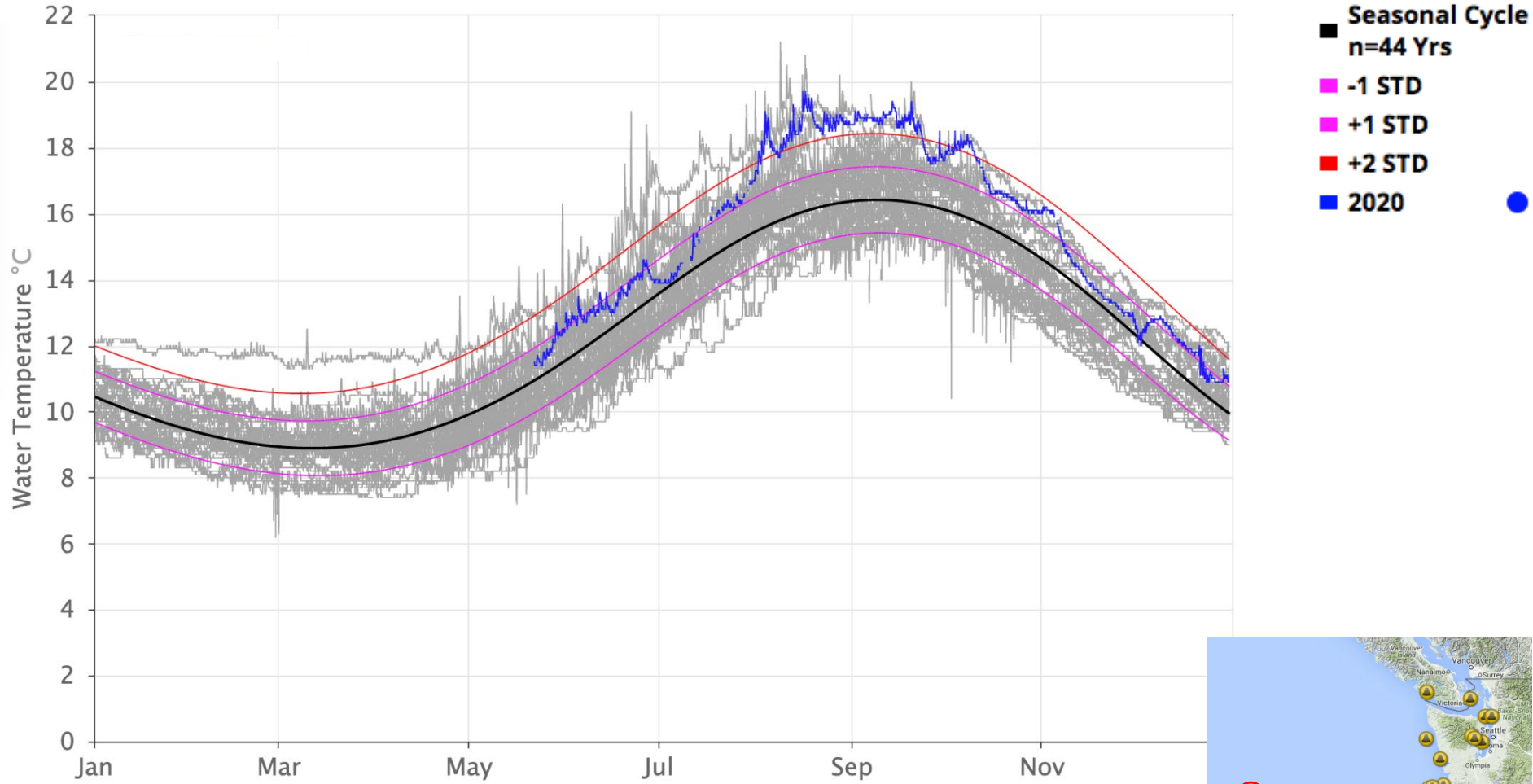
December 2020



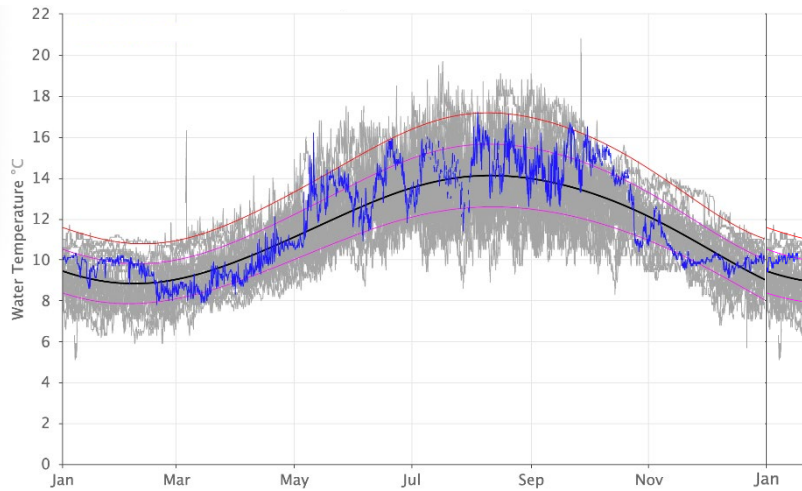
Water Temperature Anomaly



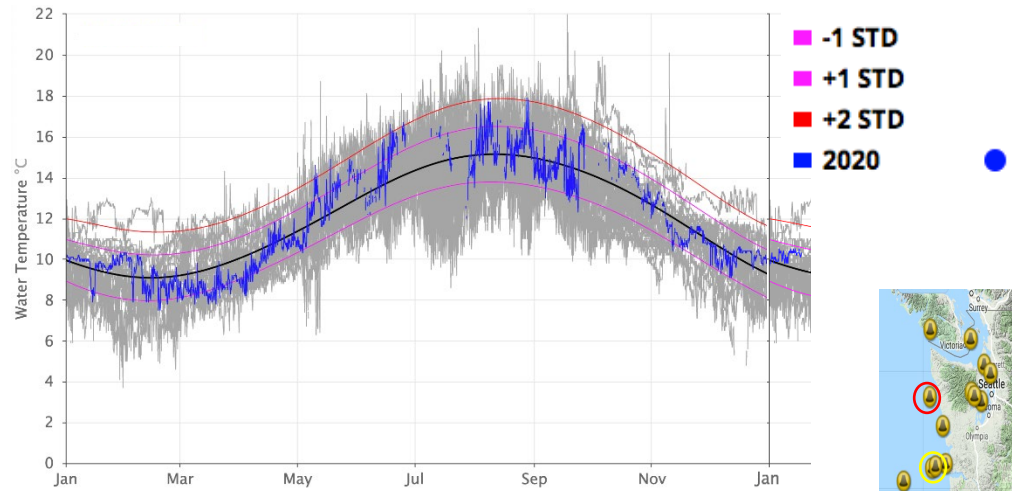
NDBC Washington



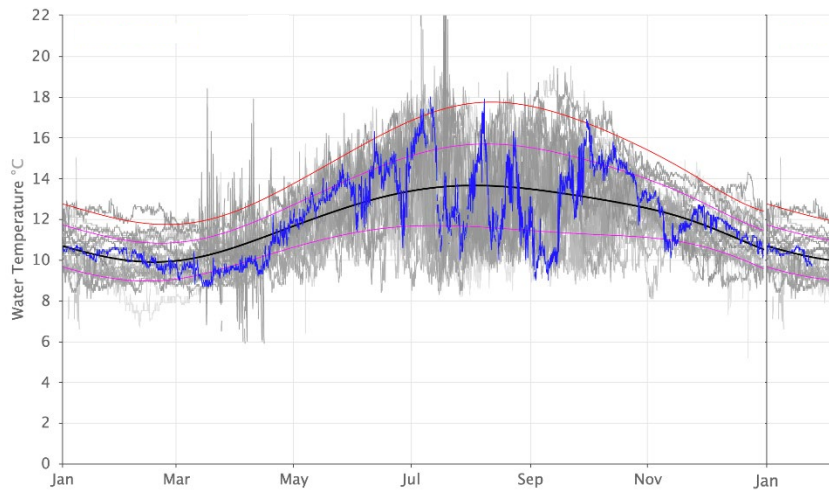
NDBC Cape Elizabeth ● 34 yrs



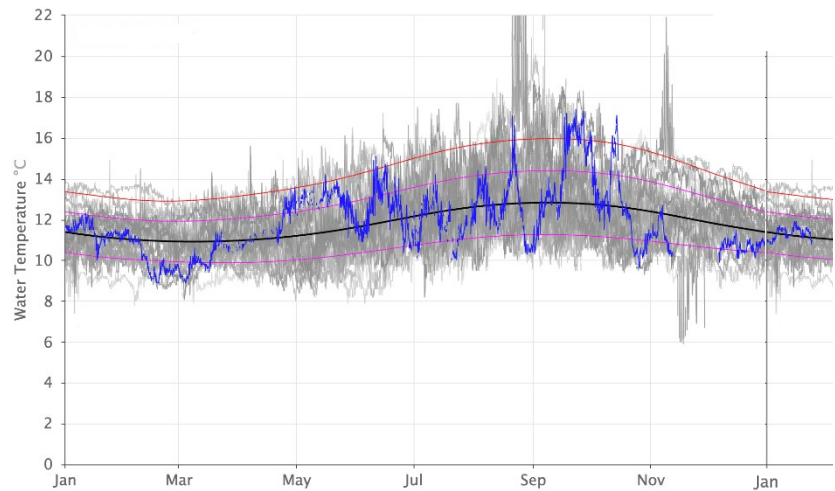
NDBC Columbia River Bar ● 37 yrs



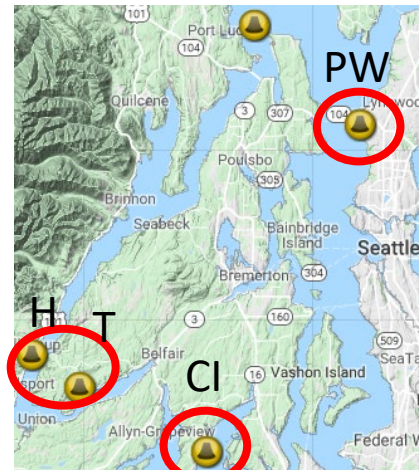
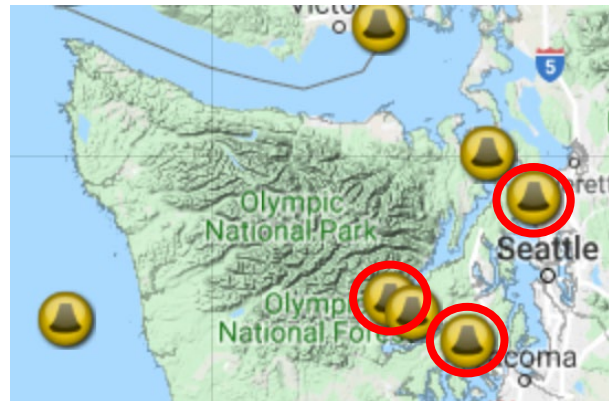
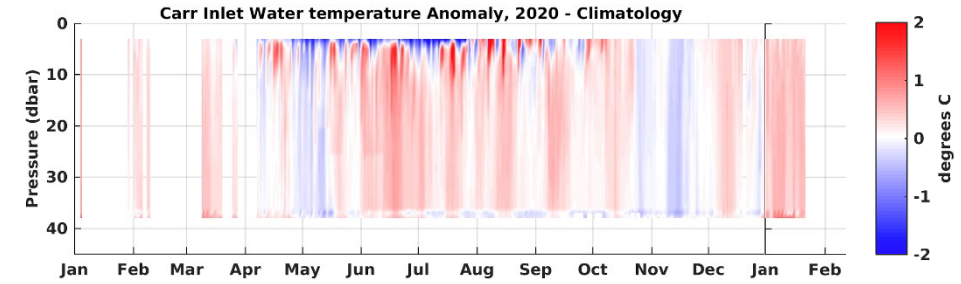
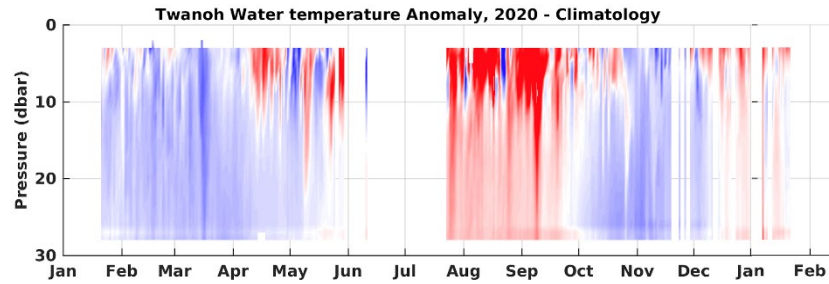
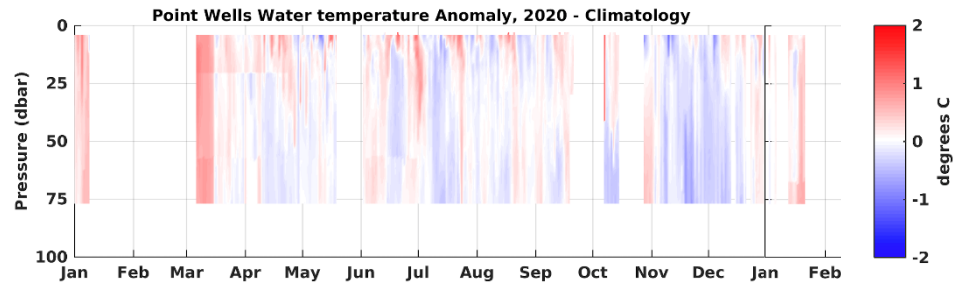
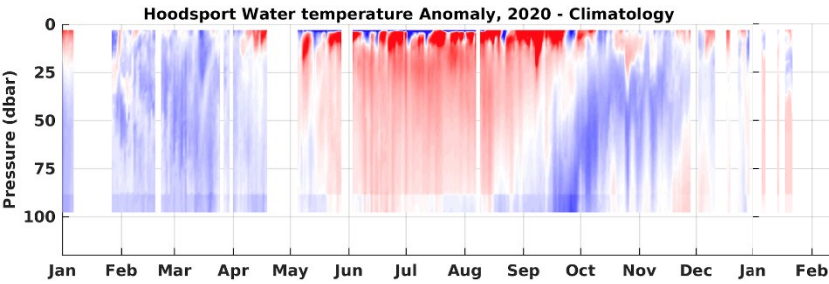
NDBC Stonewall Bank ● 34 yrs



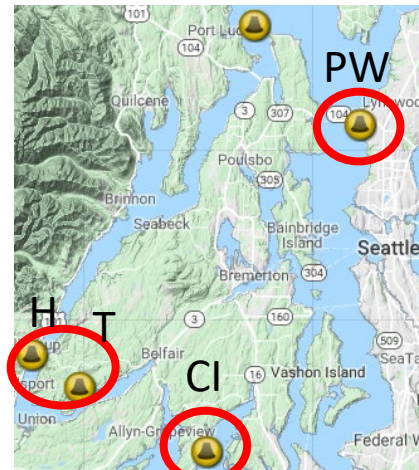
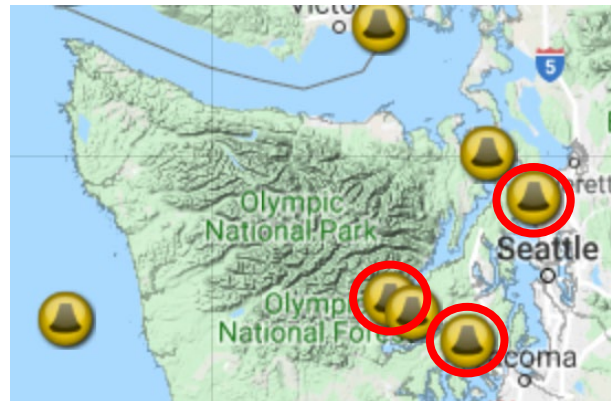
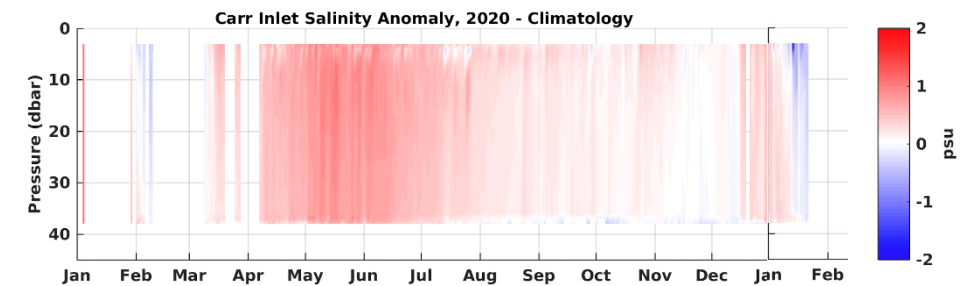
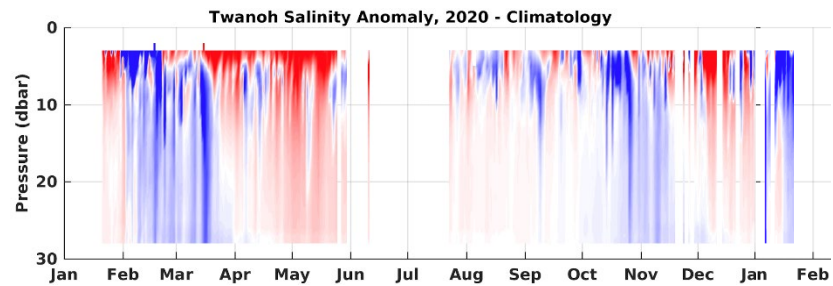
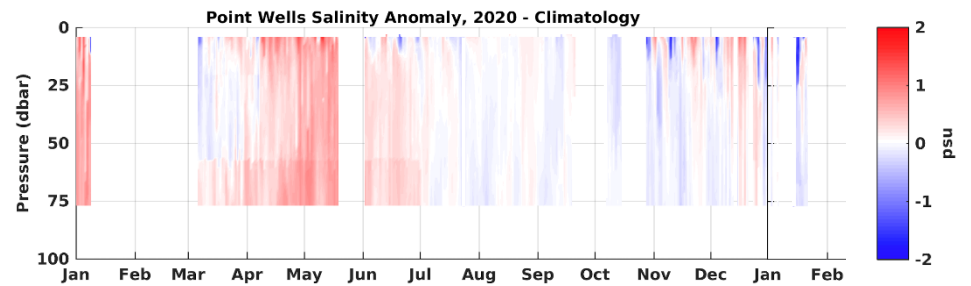
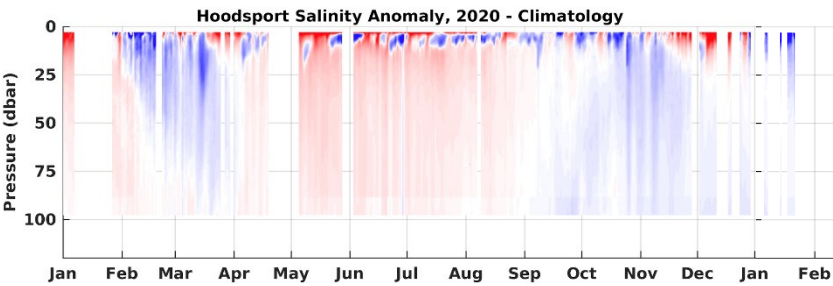
NDBC Eel River ● 39 yrs



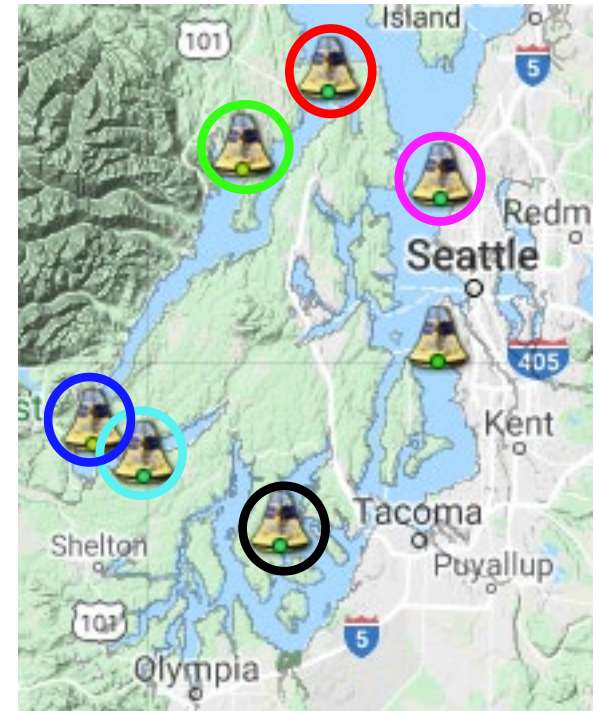
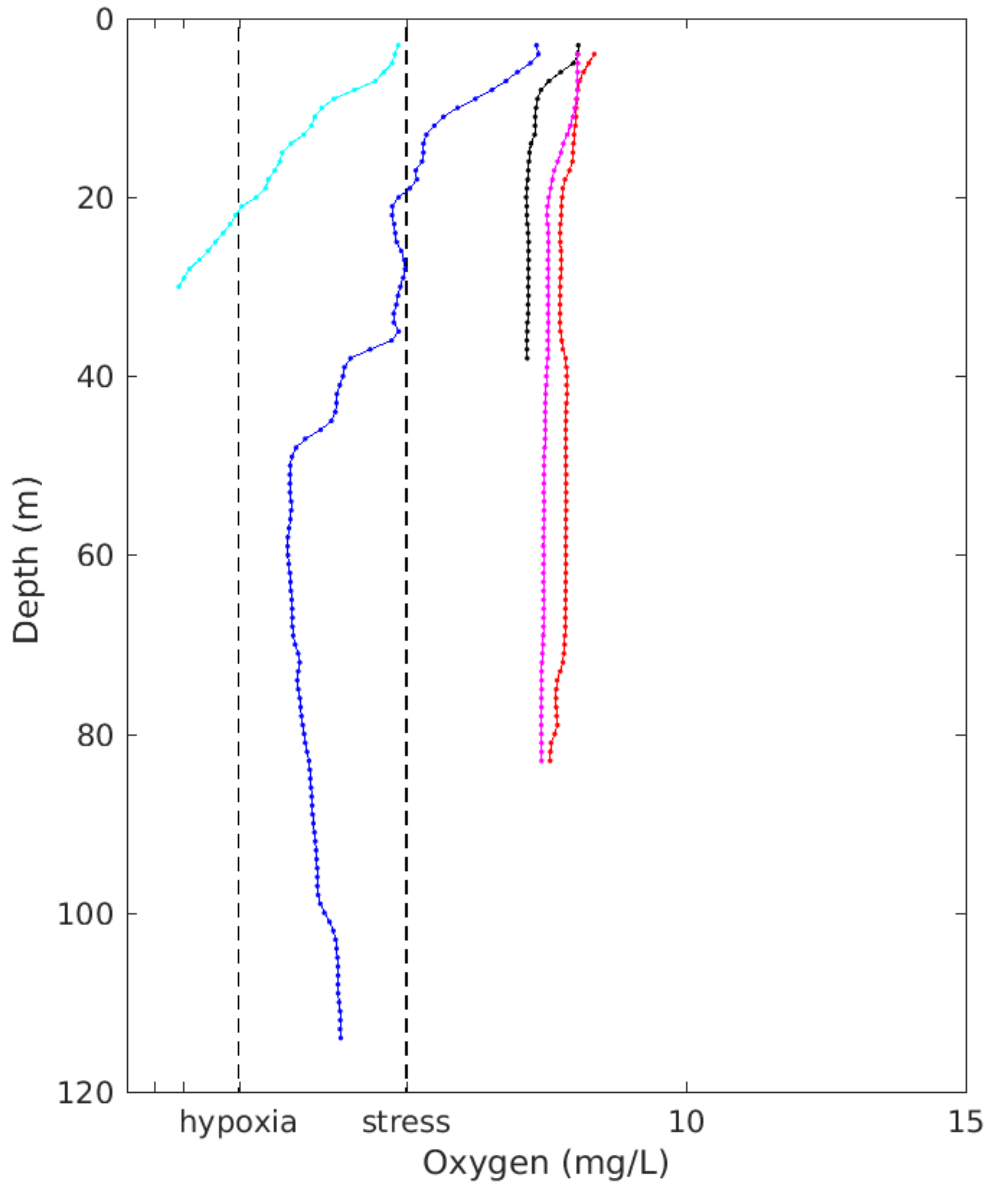
# Temperature



# Salinity

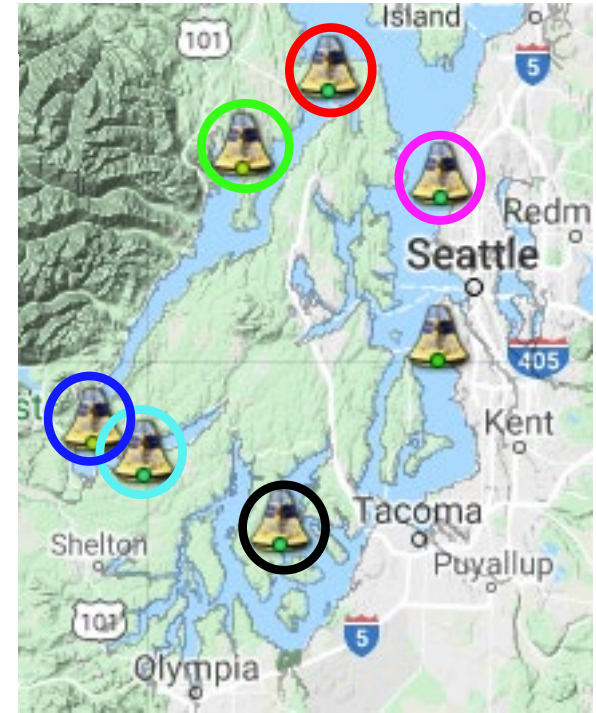
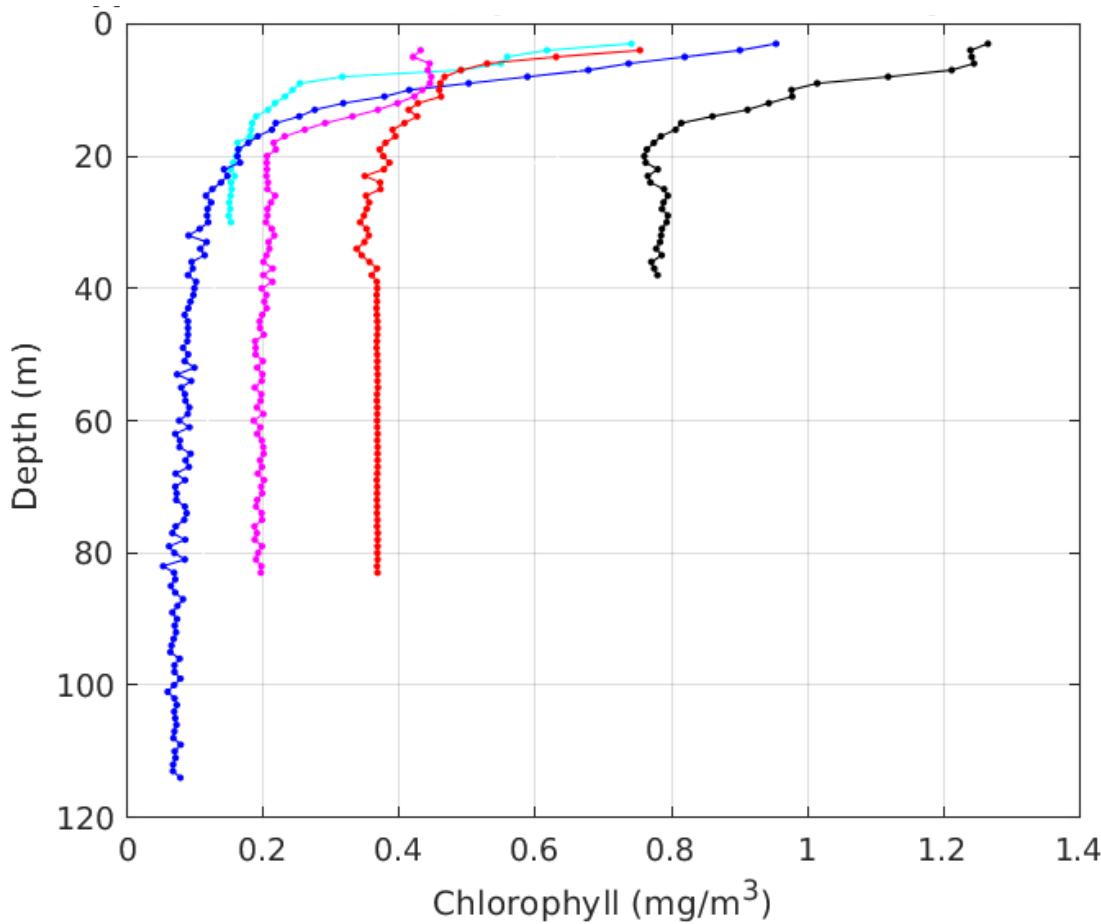


### Dissolved Oxygen



- hypoxia (2 mg/L)
- biological stress (5 mg/L)
- Twanoh (South Hood Canal), 18-Jan-2021 12:16:50
- Hoodsport (South Hood Canal), 18-Jan-2021 12:19:34
- No recent Dabob Bay (North Hood Canal) profile
- Hansville (near Admiralty Inlet), 18-Jan-2021 12:24:50
- Carr Inlet (South Sound), 18-Jan-2021 12:18:01
- Point Wells (Main Basin), 18-Jan-2021 12:19:44

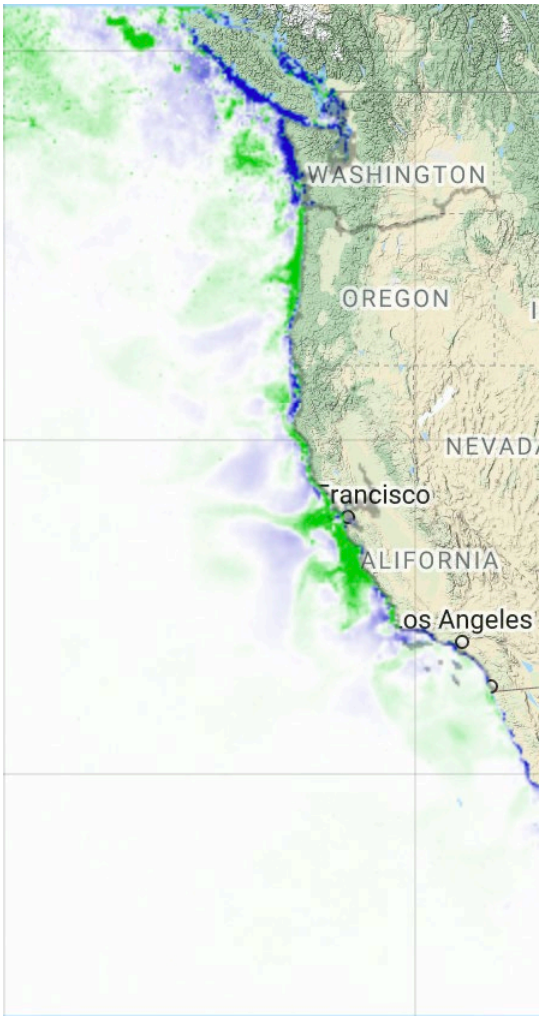
### Chlorophyll



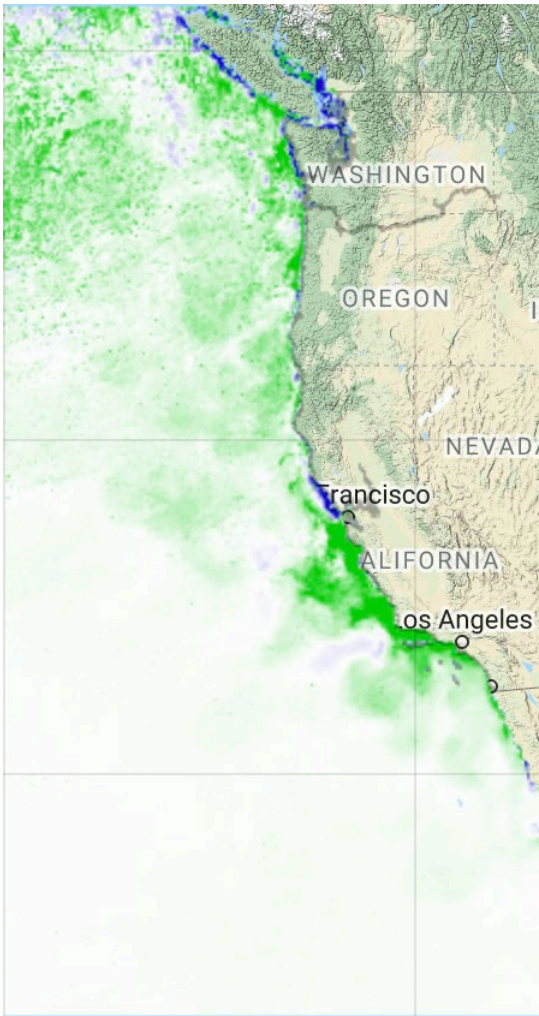
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- Hoodsport, 18-Jan-2021 12:19:34
- No recent Dabob Bay profile
- Hansville (North), 18-Jan-2021 12:24:50
- Carr Inlet, 18-Jan-2021 12:18:01
- Point Wells, 18-Jan-2021 12:19:44



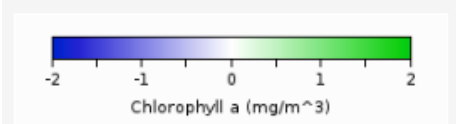
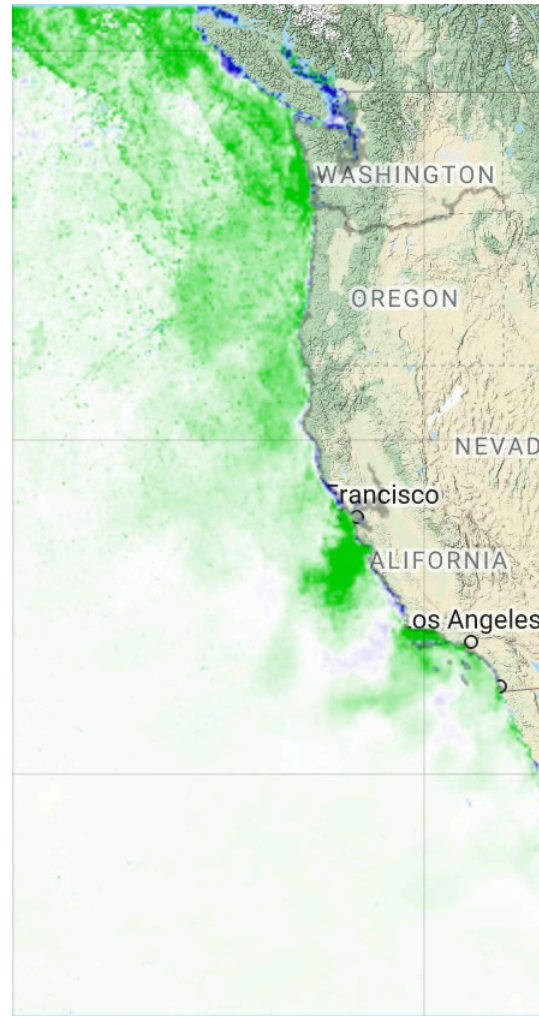
October 2020

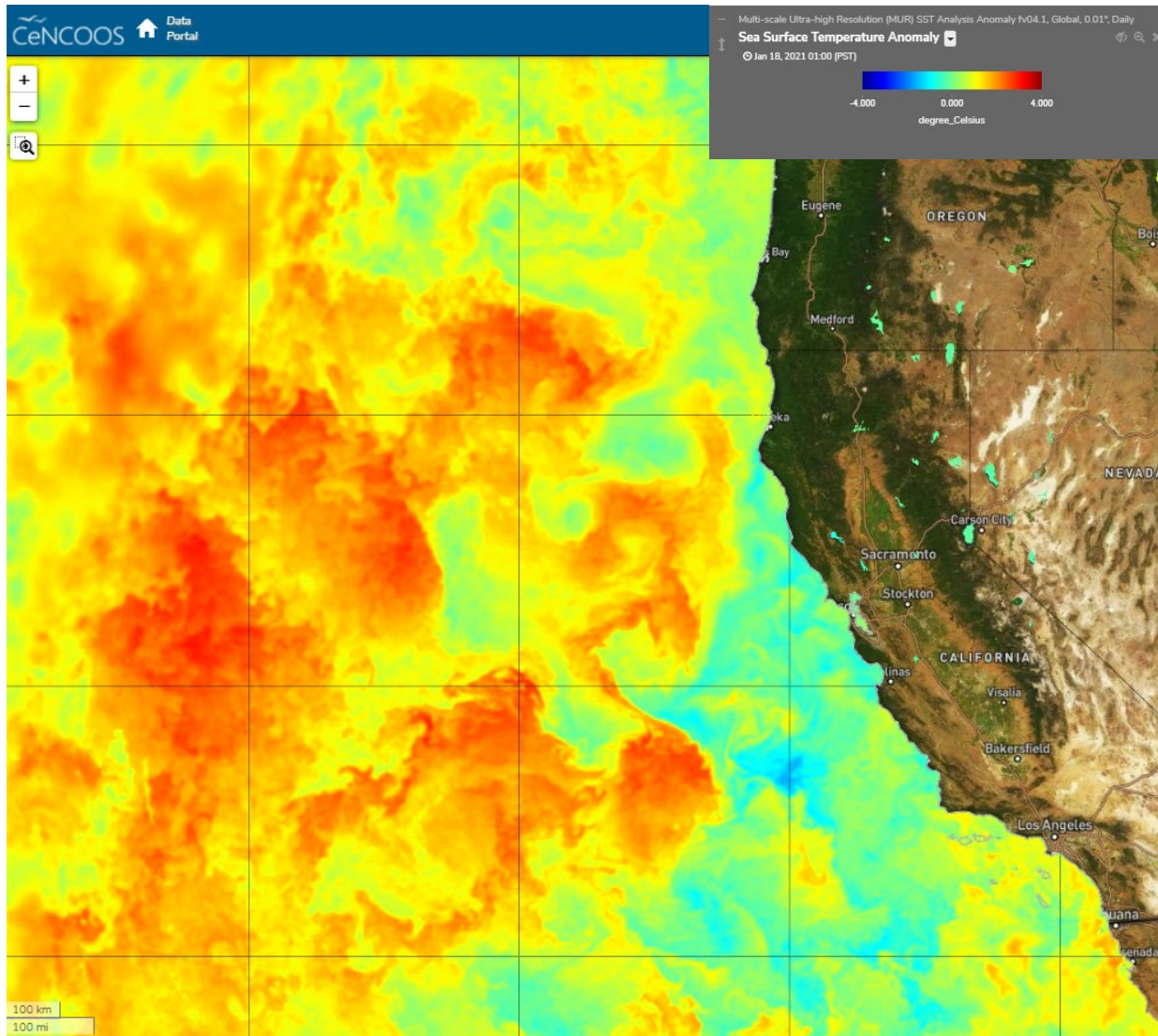


November 2020



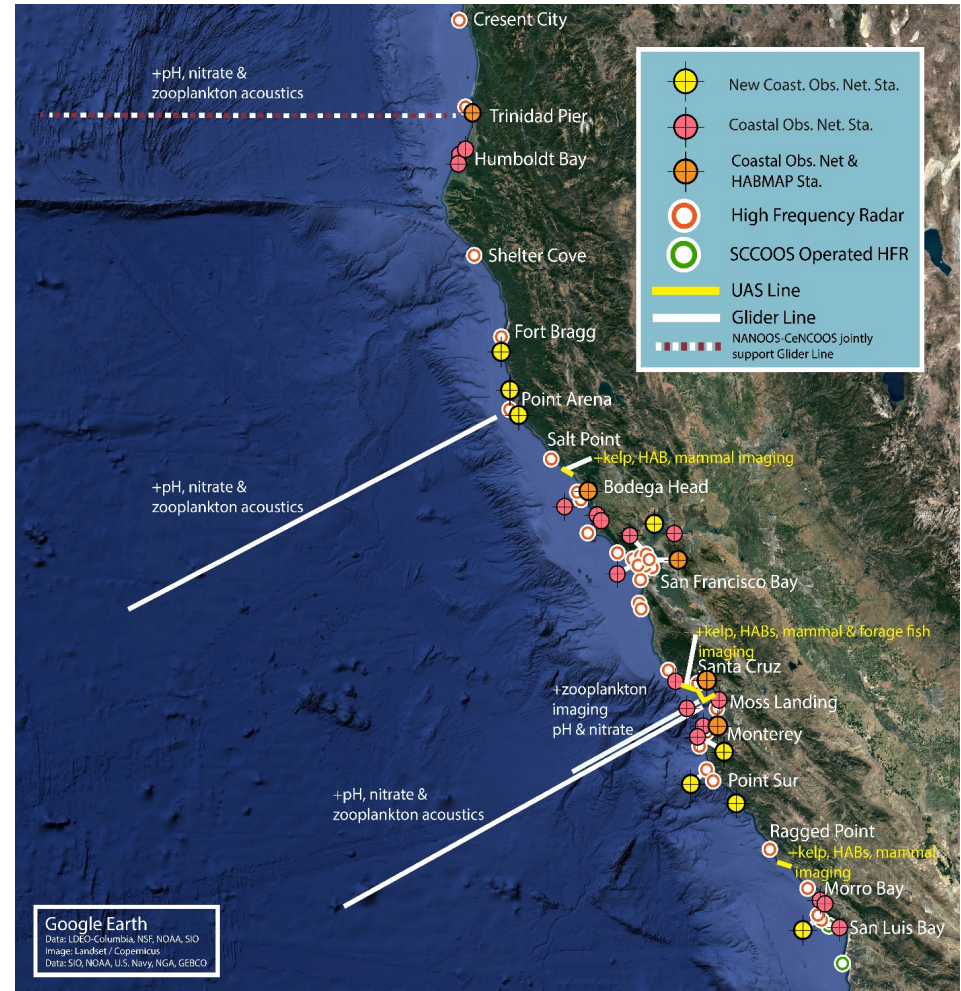
December 2020





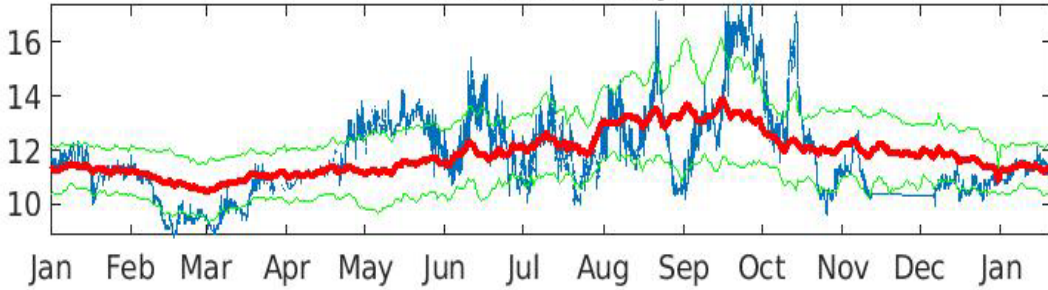
# Operations under COVID-19 & Wildfires

- 5-year renewal proposal to US IOOS-NOAA (24 partner organizations; 63 PI and Co-Is, and 27 LOS)
- ICOOS Act Reauthorization passed
- Many datastreams experienced increased downtime due to limited maintenance access and power outages associated with wildfires.
- Ongoing servicing issues at small number of stations--including two SF bay moorings that broke loose
- Glider operations are currently on pause due to limited ship access to deploy/retrieve
- Working with delivery partners to understand impacts and improve resilience

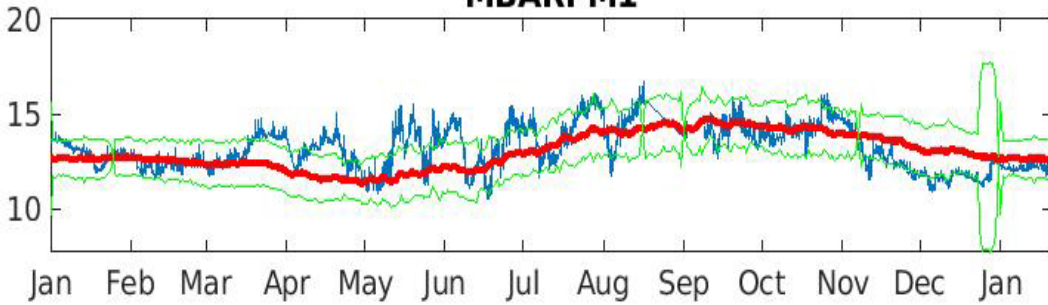


# A look back: Temp from Moorings 2020-21

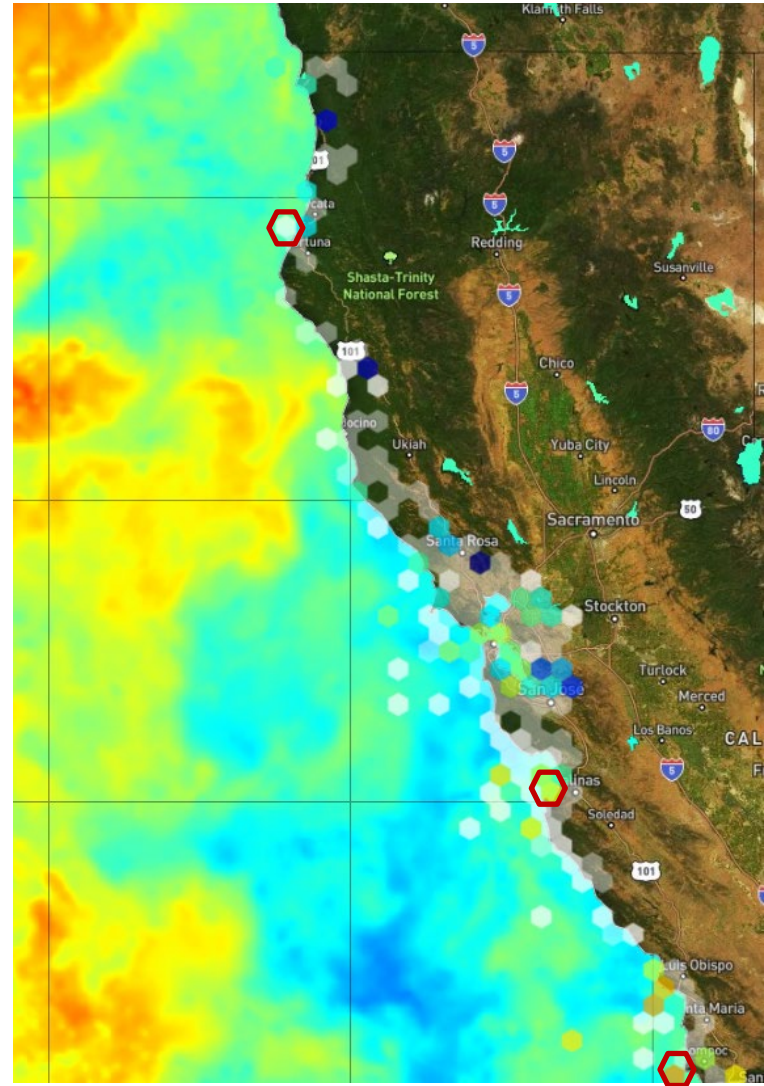
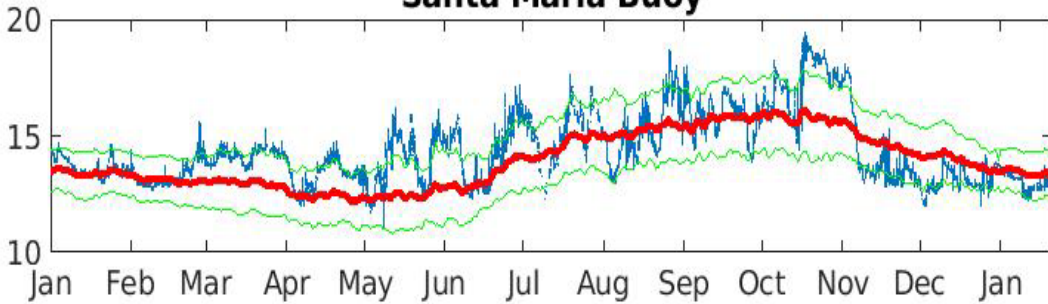
### Eel River Buoy



### MBARI M1

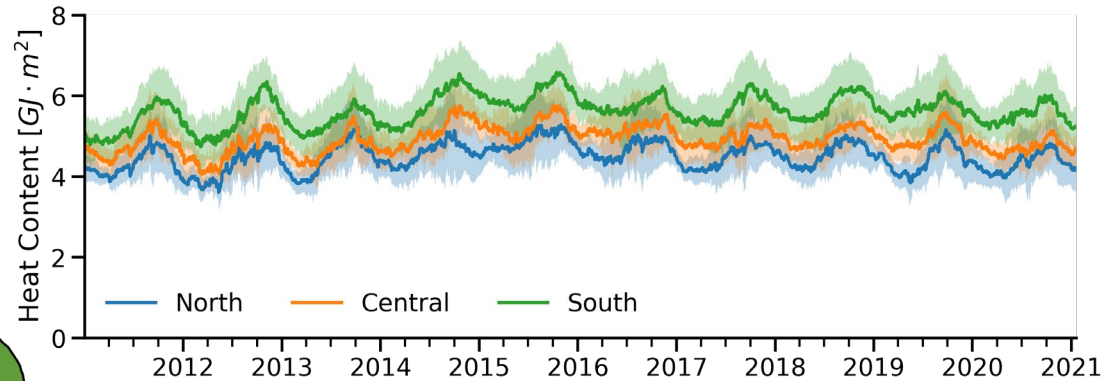
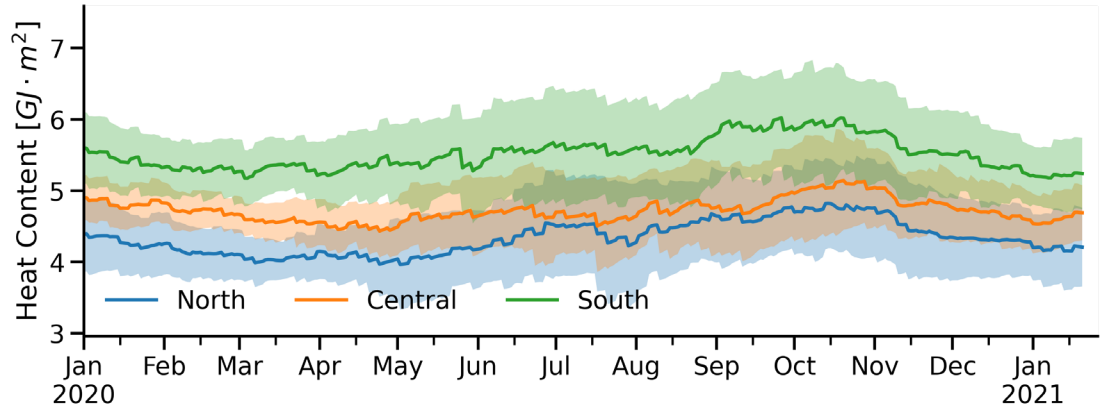
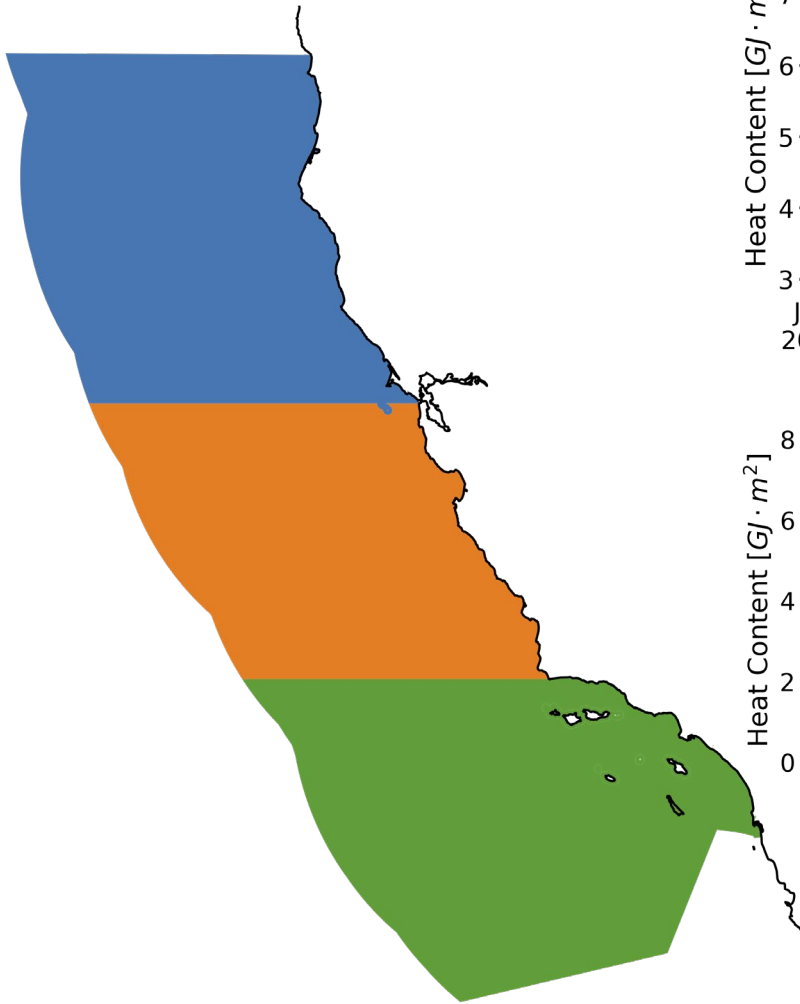


### Santa Maria Buoy



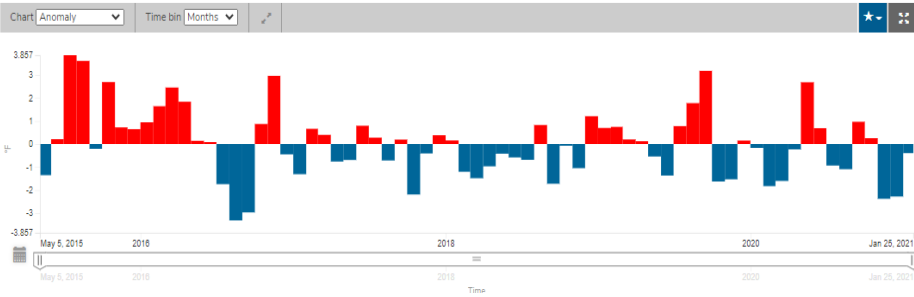
# A look back: Ocean Heat Content

## California MPA Bioregions

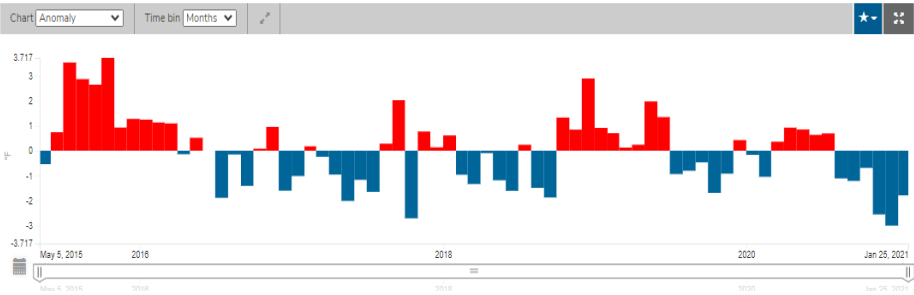


# Temp Anomaly: Moorings

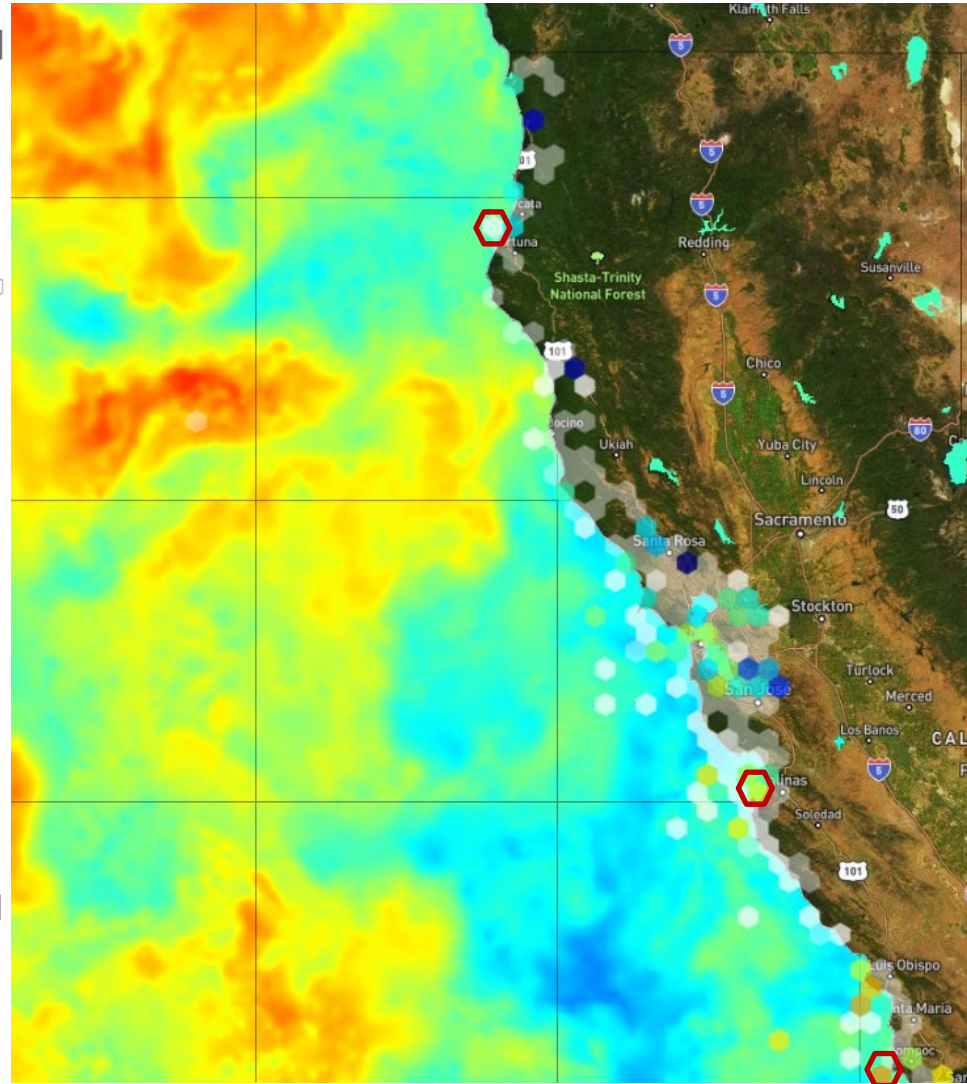
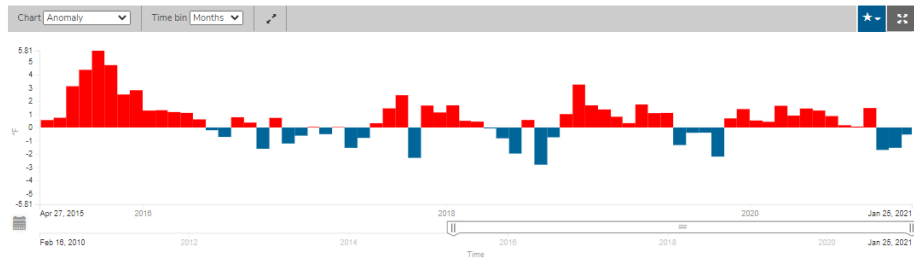
46022 - EEL RIVER - 17NM WSW of Eureka, CA



M1 MBARI

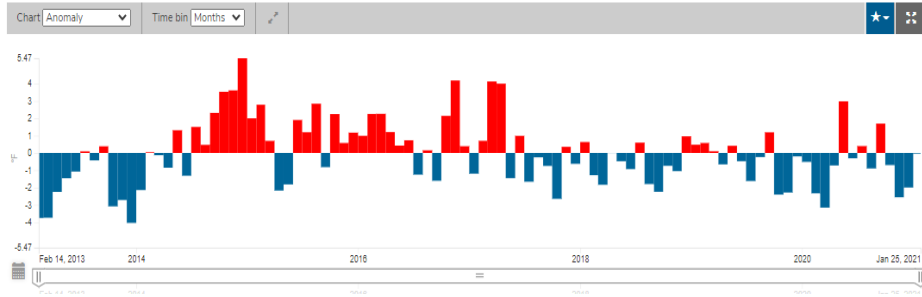


Santa Maria - 21 NM NW of Pt Arguello, CA (46011)

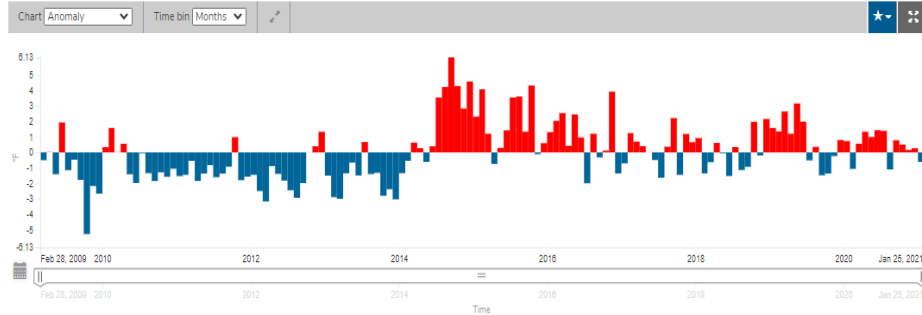


# Temp Anomaly: Shore Stations

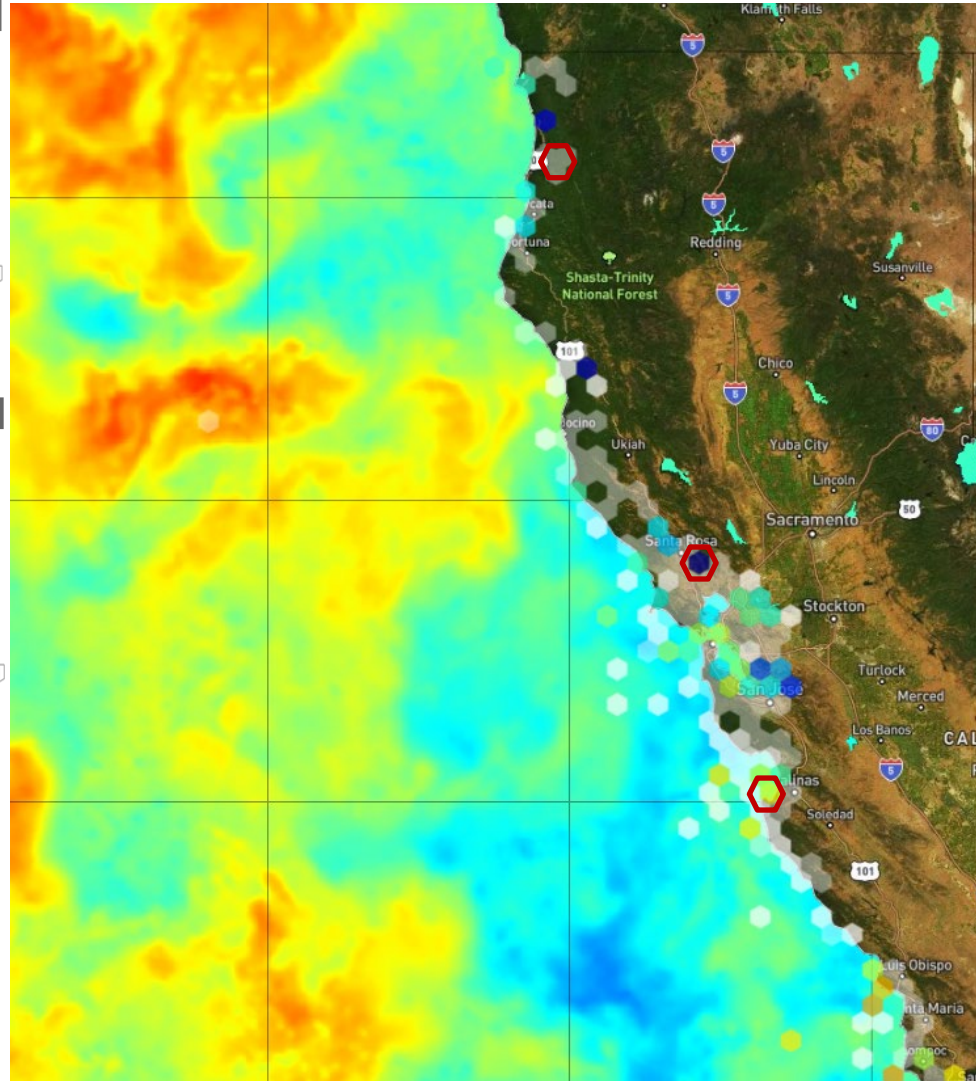
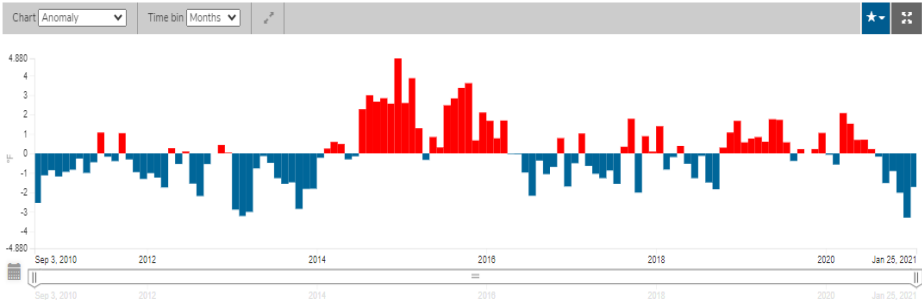
## HSU Trinidad Station



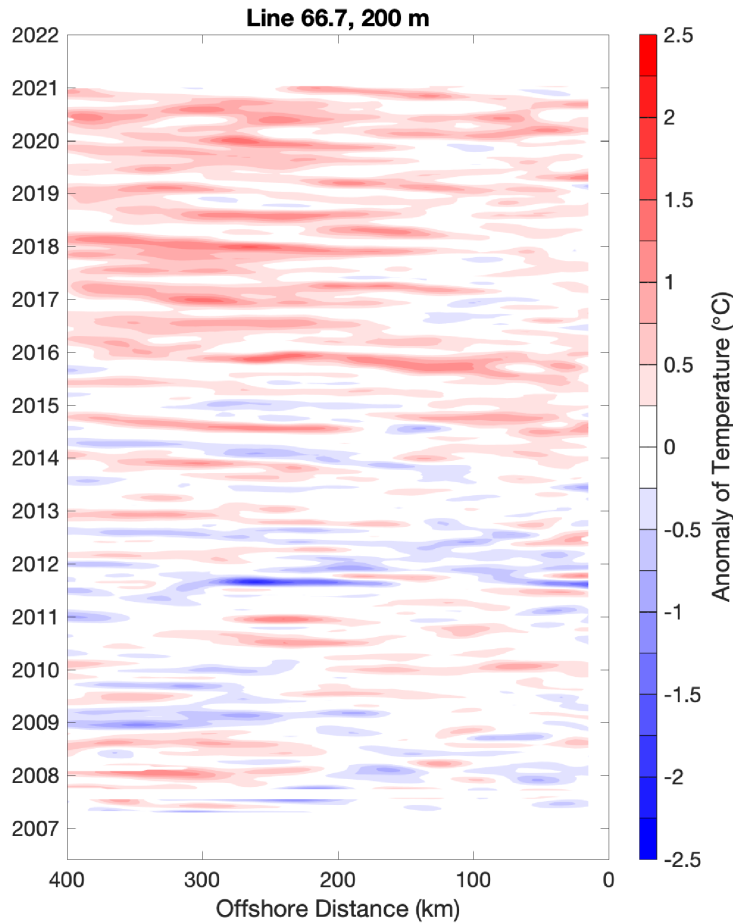
## Bodega Bay (BML\_WTS)



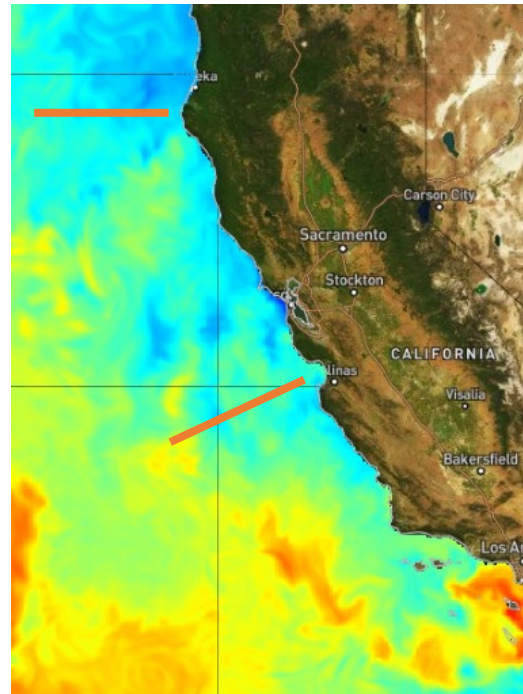
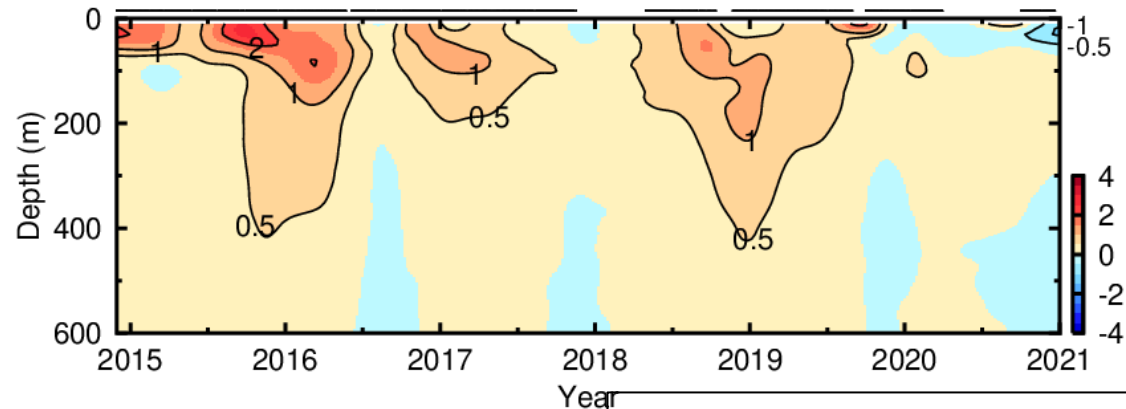
## Moss Landing Marine Laboratories Seawater Intake



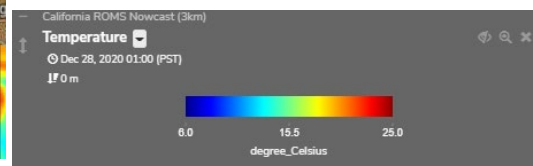
# Offshore Temp Anomalies: Gliders



**Trinidad Head temperature anomaly averaged over inshore 200 km**



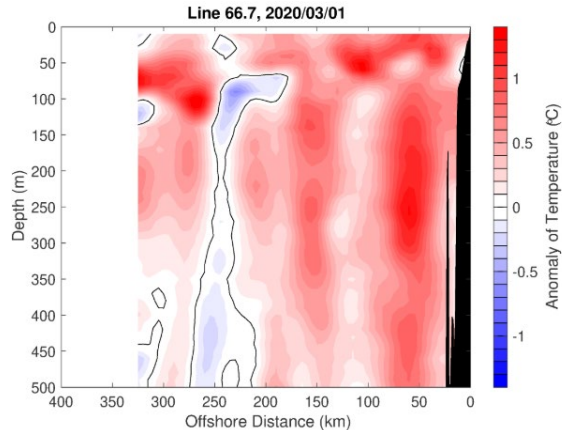
The California ROMS model extends from CA-Oregon border south to Mexico and has a resolution of 3 km. Near-real-time forecasts (72 hr) and nowcasts are available for water temperature, salinity, SSH and currents. This model is operated by UCLA at <https://www.cencoos.org/data/models/roms/ca>.



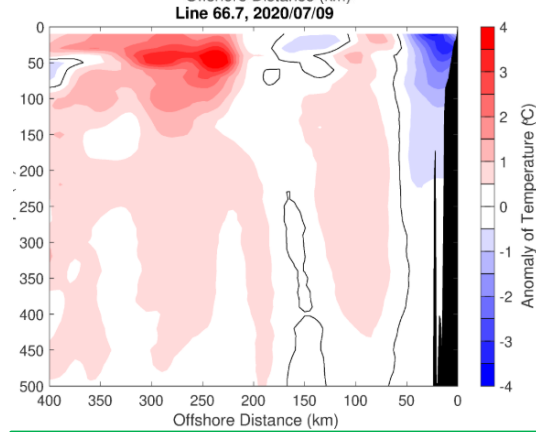


# Temp Anomaly - Monterey Bay Region

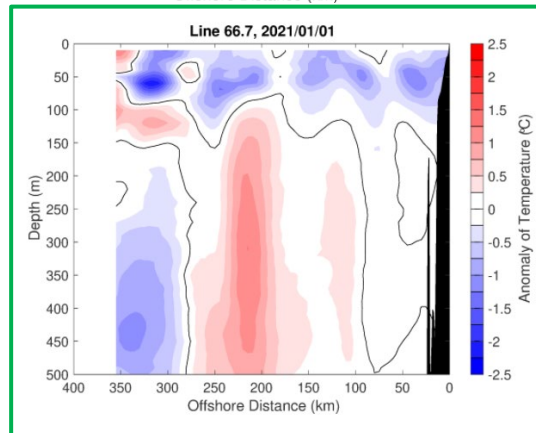
May 2020



July 2020

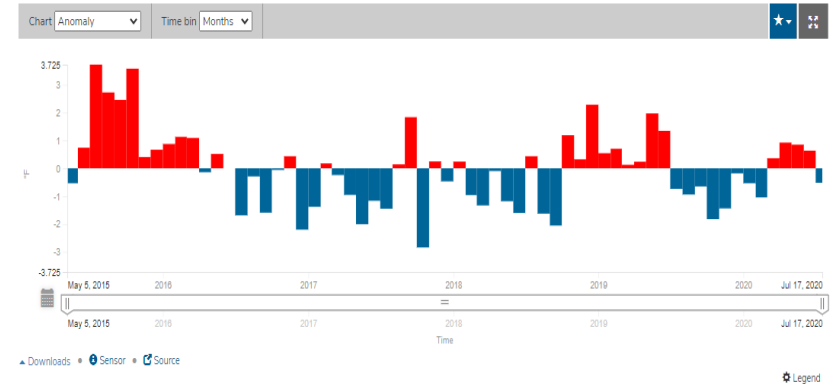


Jan 2021

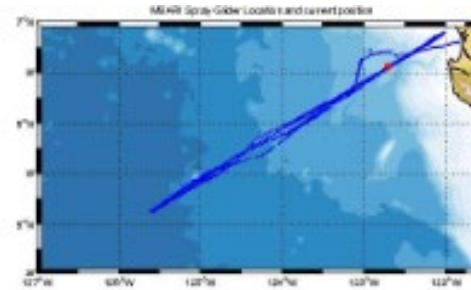
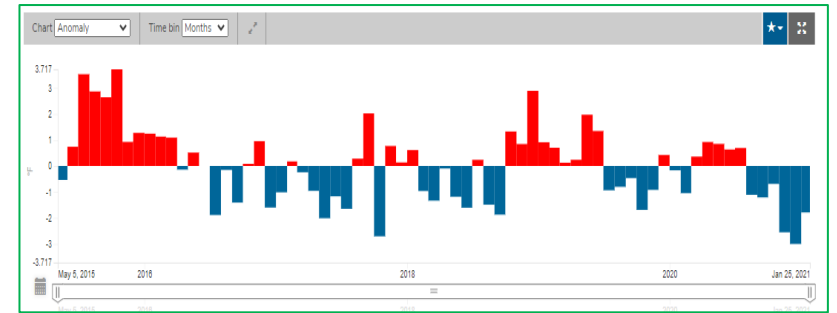


## M1 mooring

July 2020

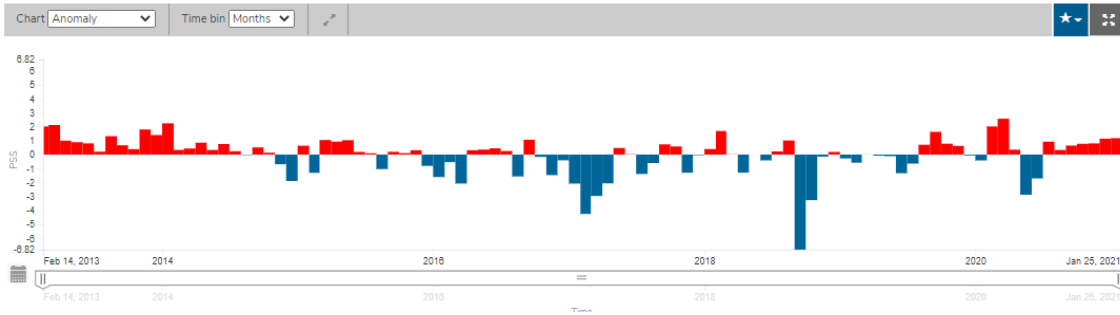


Jan 2021

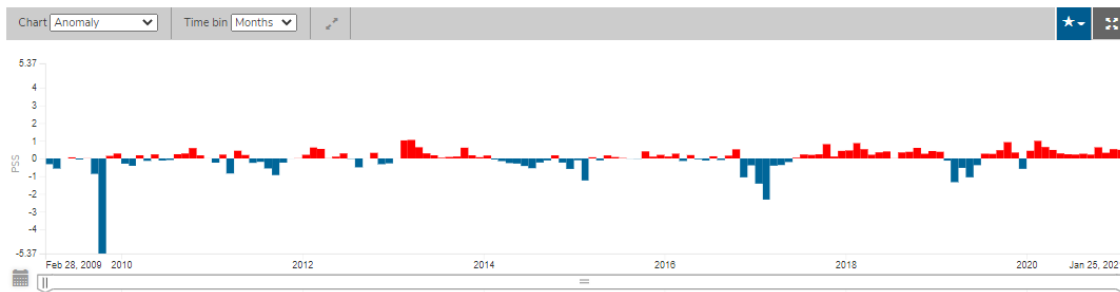


# Salinity Anomaly: Shore Stations

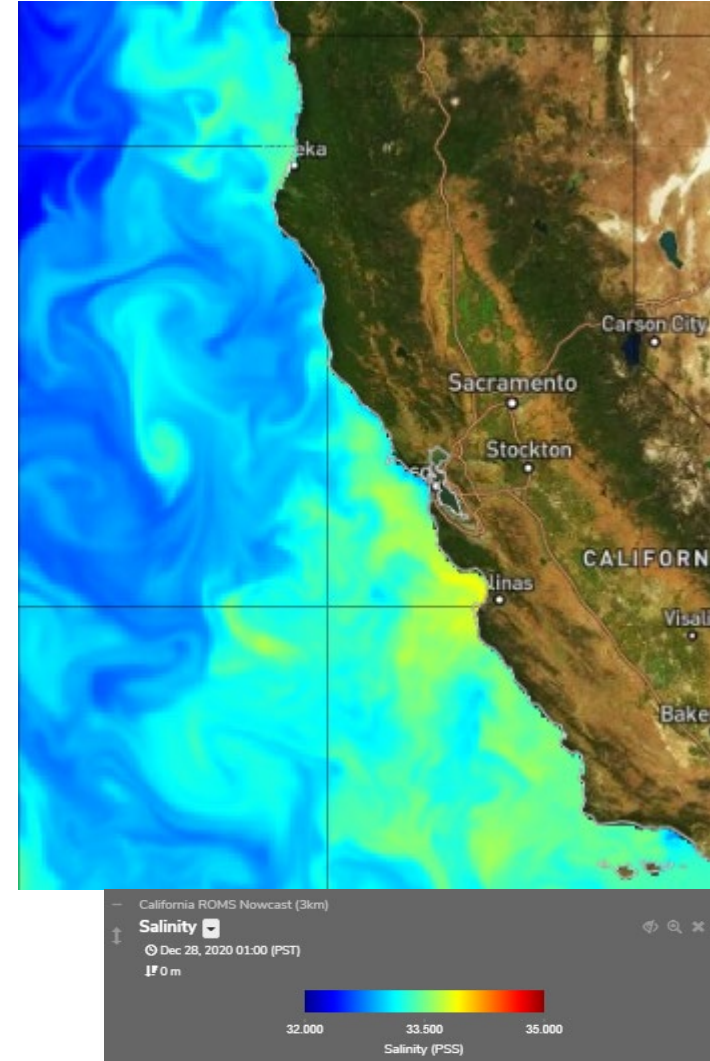
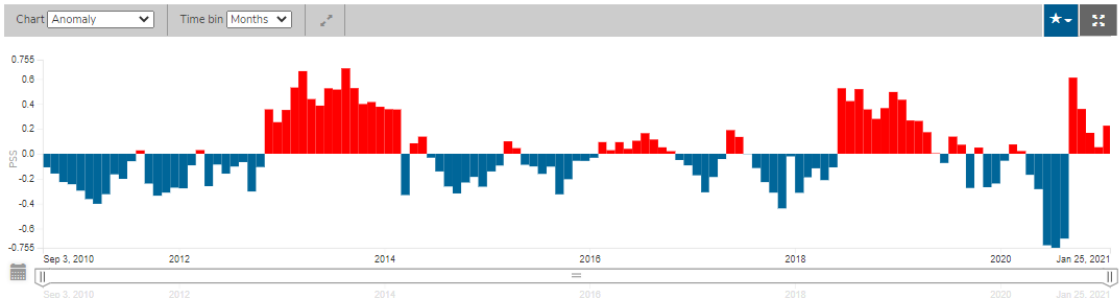
46022 - EEL RIVER - 17NM WSW of Eureka, CA



Bodega Bay (BML\_WTS)

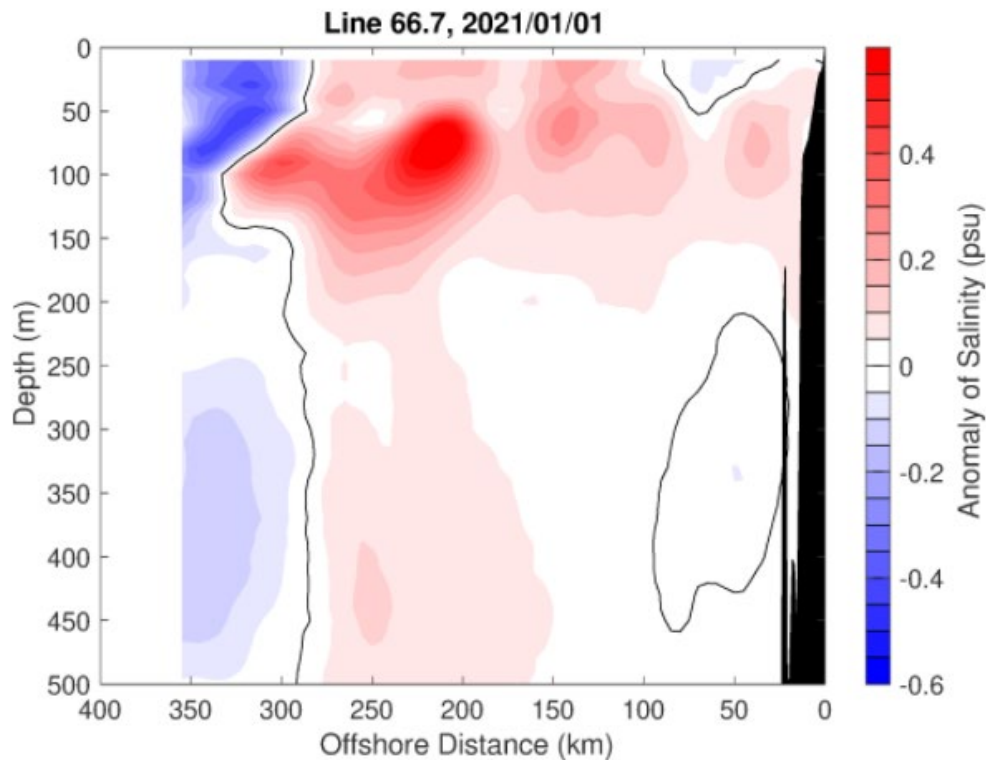
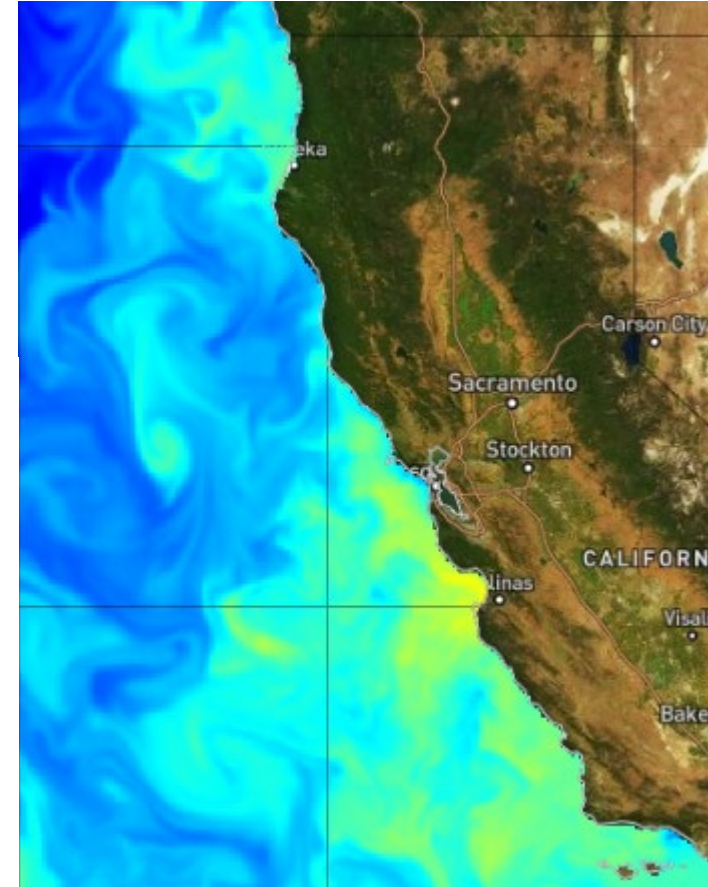
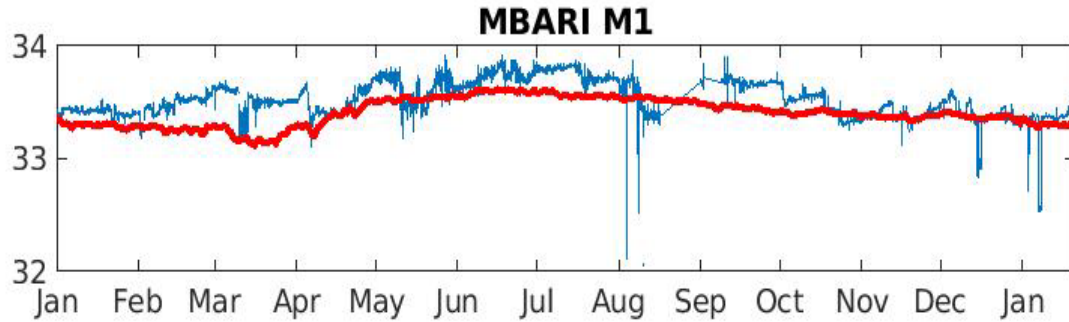


Moss Landing Marine Laboratories Seawater Intake

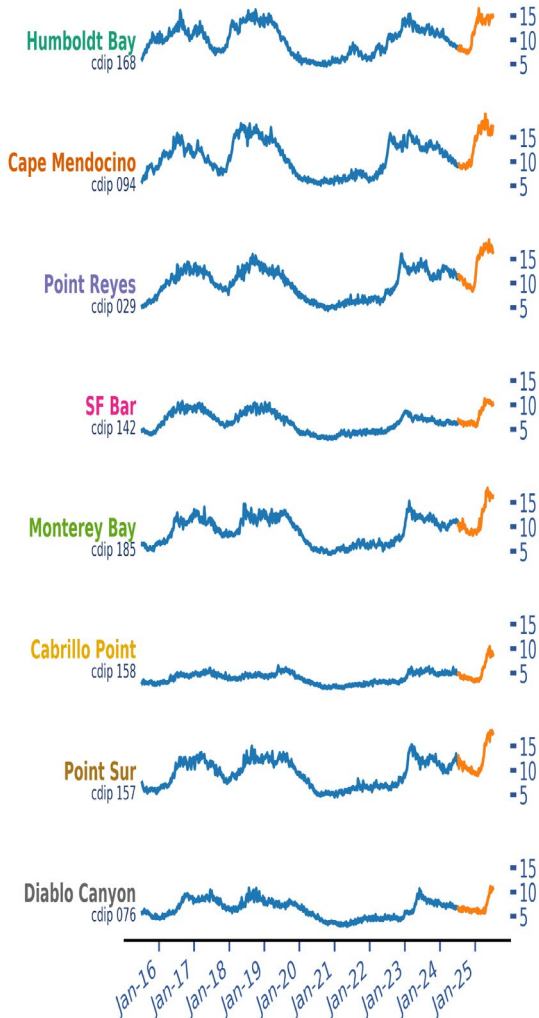
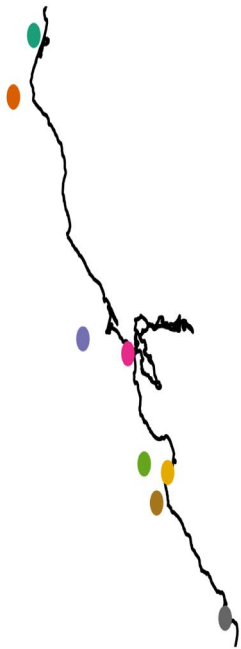


# Salinity M1 and Line 67

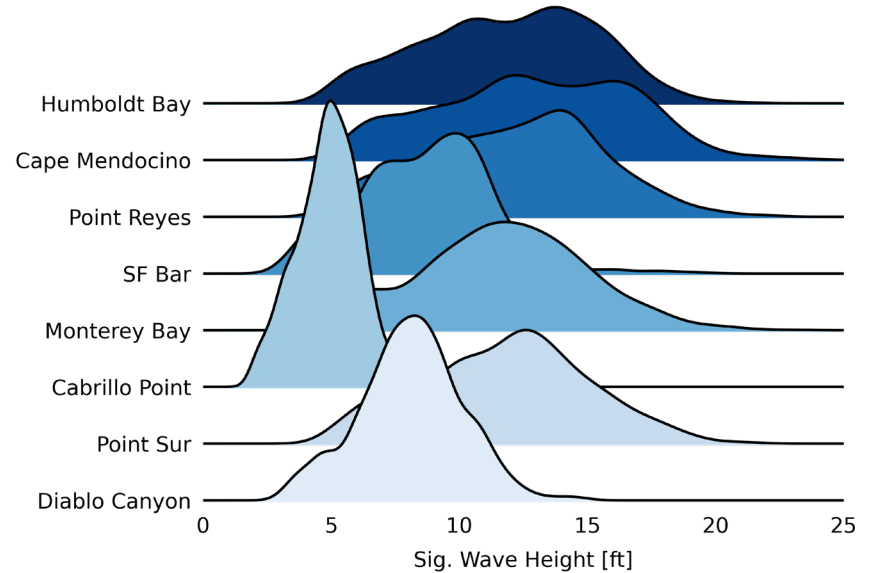
## M1 mooring



# CeNCOOS Big Waves



Distribution of Wave Height, Past 30 Days



**5** KPIX CBS SF BayArea NEWS WEATHER SPORTS BEST OF VIDEO MORE

CBSN Bay Area WATCH NOW Wet Weather Forecast 57° Q

## Monster Waves Crashing Along Bay Area Ocean Beaches; Forecasters Warn Of Deadly Sneaker Waves

SAN FRANCISCO (CBS SF) — Just a week after large waves and a treacherous rip tide claimed the lives of a father and his two young children, forecasters warned beachgoers to be an alert for massive waves, some towering as high as 30 feet, crashing onto beaches Sunday from Sonoma County to Monterey.

Michael Wyman, 40, drowned last Sunday afternoon at Blind Beach near Jenner while attempting to save his 4-year-old son and 7-year-old daughter, who were swept out to sea by the turbulent waves. The children remain missing and are presumed to have died.

Large waves and violent surf also claimed the life of a man who was swept off the rocks near Beach Boulevard and Paloma Ave. in Pacifica in December.



# CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Thank you

[aharper@mbari.org](mailto:aharper@mbari.org)

NOAA West Watch Update

Jan 2021



## SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM



### NOAA West Watch Update: Southern California

Megan Medina, Ross Timmerman, Clarissa Anderson and James Behrens  
26-January 2020

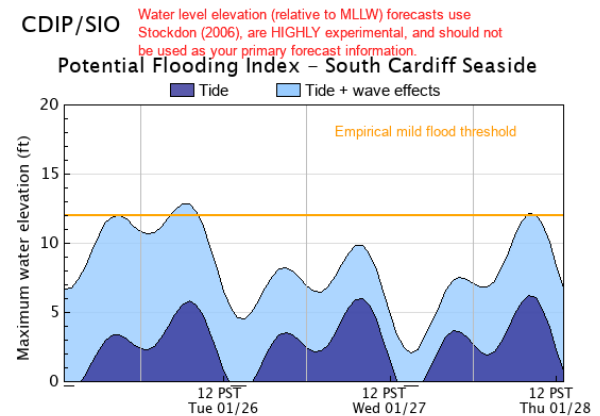
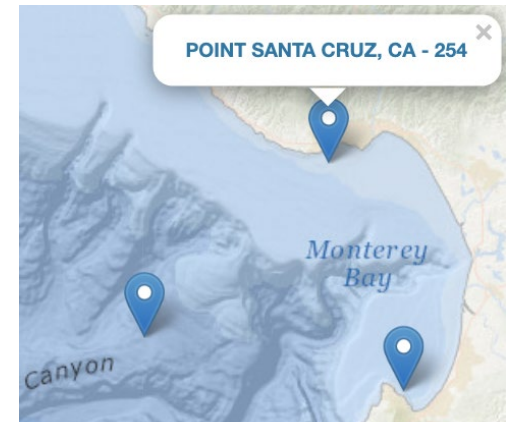
# Coastal Data Information Program (CDIP)



- New station deployed in Santa Cruz (CDIP #254)
  - <http://cdip.ucsd.edu/m/products/?stn=254p1>
  - New Datawell MK4 Waverider
    - Waves, surface current, SST, air temperature
  - In support of CA State Parks funded coastal inundation research and nearshore wave model validation
  - Funded for 2 years initially
- Monitoring coastal flooding to improve forecasts
  - In partnership with coastal processes group at SIO
  - 12 inundation events recorded in 2020
  - 2 events in 2021 so far



[cfirt.cdip.ucsd.edu](http://cfirt.cdip.ucsd.edu)



# Coastal Data Information Program (CDIP)

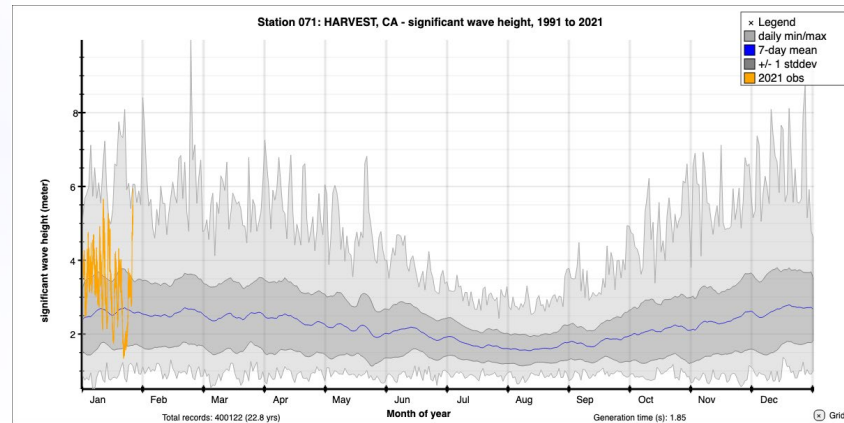
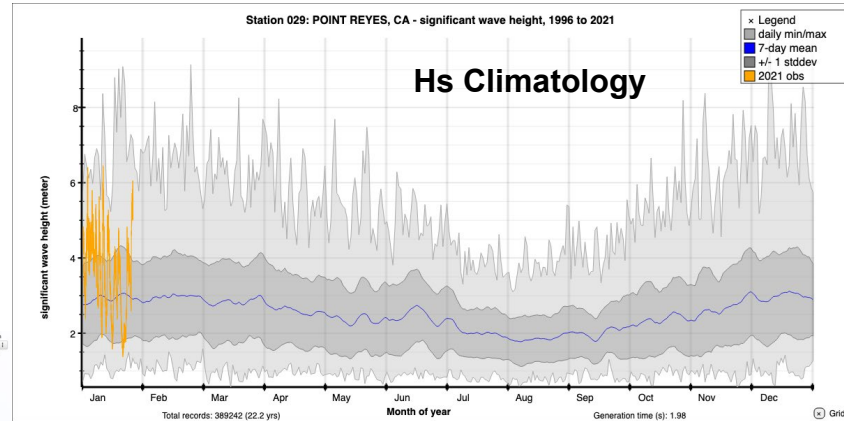
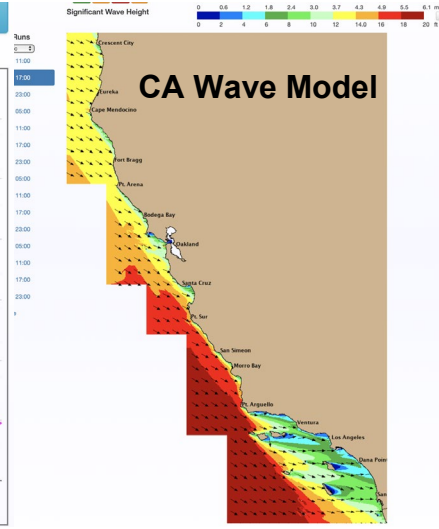
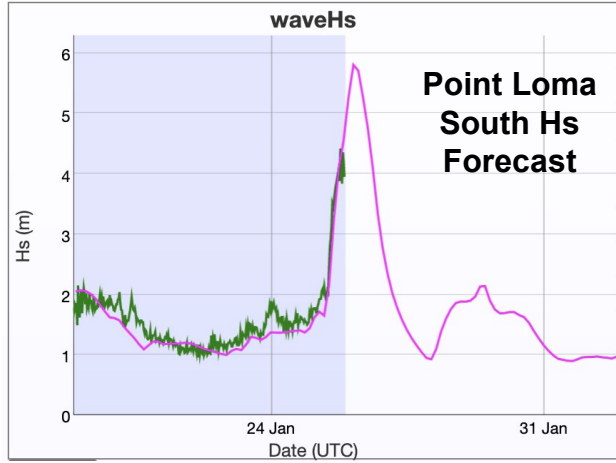


- Average fall/winter SST
- Energetic start to the year
  - Current storm: Hs of 18' with 35-40' individual waves possible
  - Peak waves likely to occur during low tide

Date:

— Observed  
— NOAA/WW3

Hs Tp Dp SST





# California King Tides: Nov 15-16, Dec 13-15, Jan 11-12



1/11/21 - Descanso St., Imperial Beach

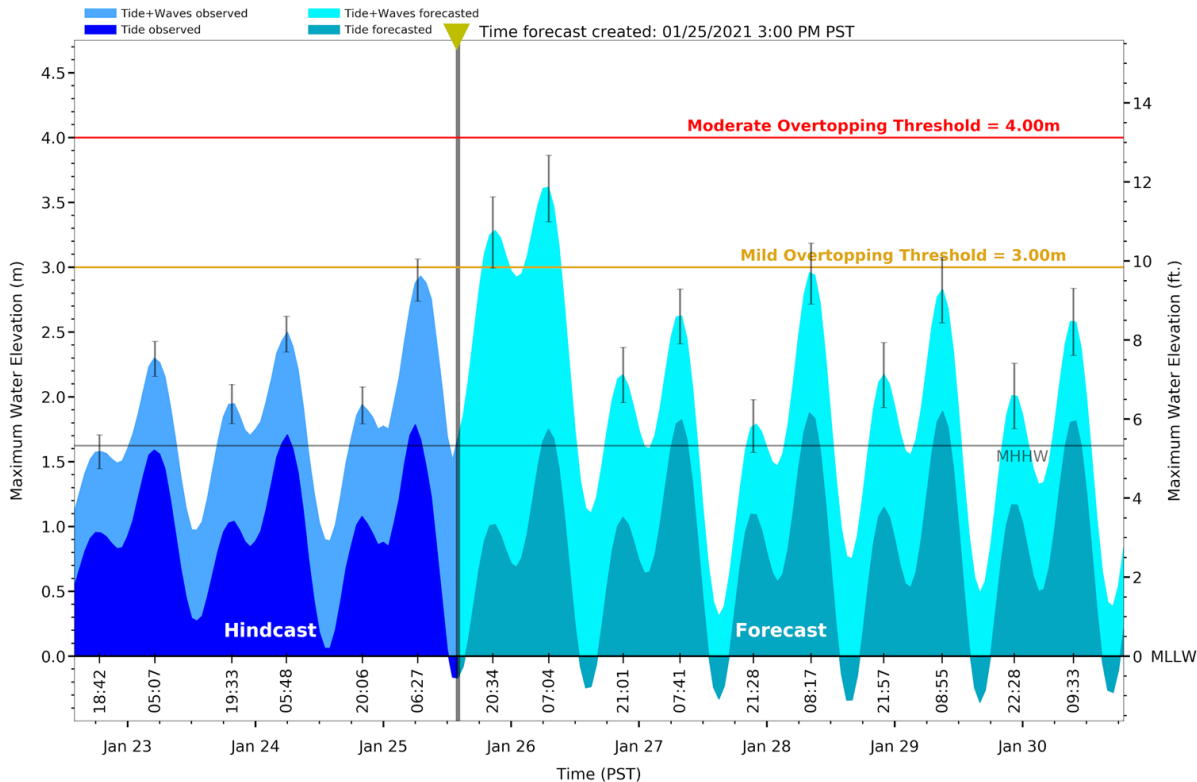


12/15/20 - Redondo Beach



11/15/20 - Santa Barbara Harbor Breakwater

# CCCIA: Imperial Beach Flood Forecasts



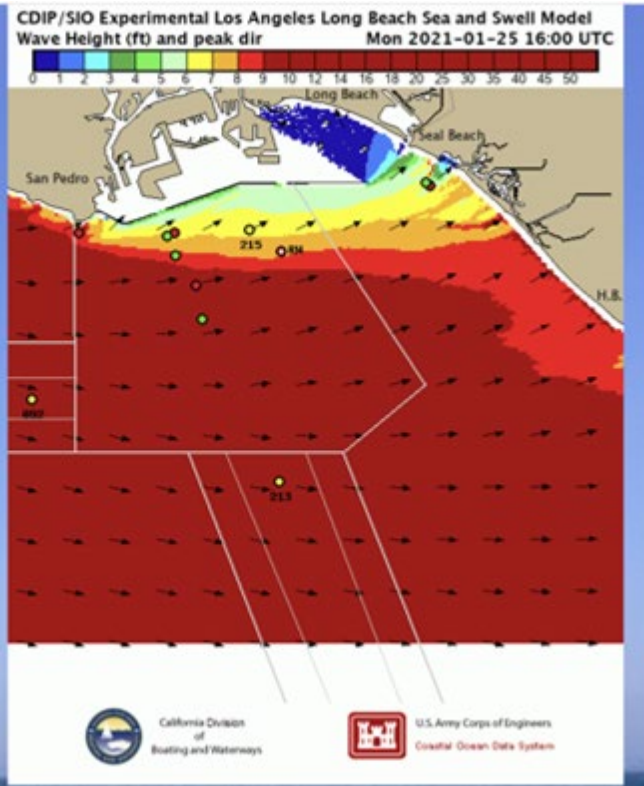
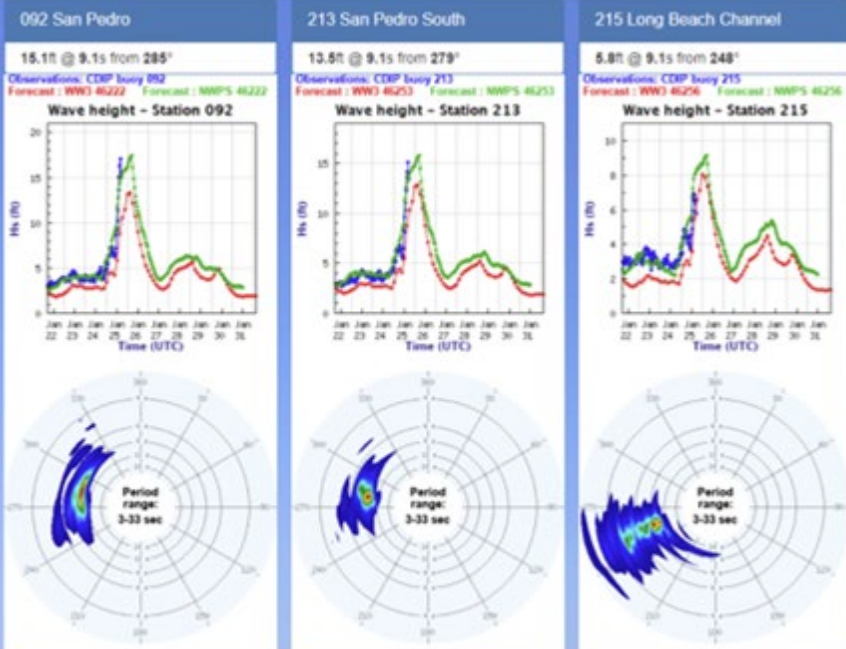
2021-01-26 Flood forecast for Palm Avenue, Imperial Beach

<https://climateadapt.ucsd.edu/imperialbeach/forecast/>

Merrifield (SIO)



# Marine Exchange of Southern California



1/25/21

17-foot seas on the San Pedro buoy #092

Gusts to 55 knots at 6:00 AM



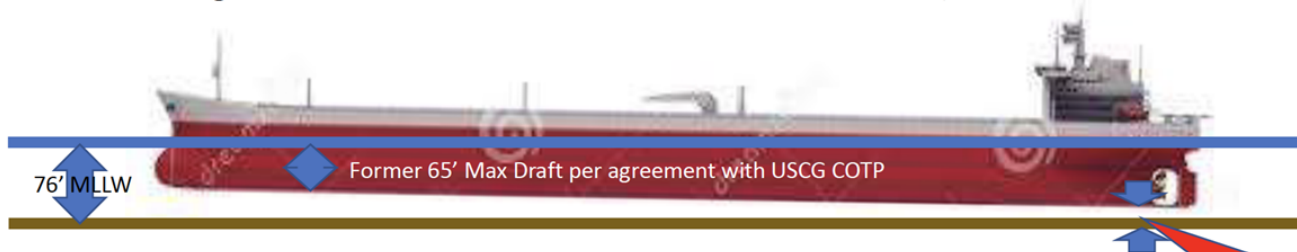
Captain Kip Louttit

# Under Keel Clearance (UKC): Go/No Go?

With Zero Pitch there is 11' of under keel clearance



With 1 degree of Pitch there is a 10' increase in draft for a 1,100 foot tanker:



1 degree of pitch reduces the UKC to 1 foot.

1' UKC!!



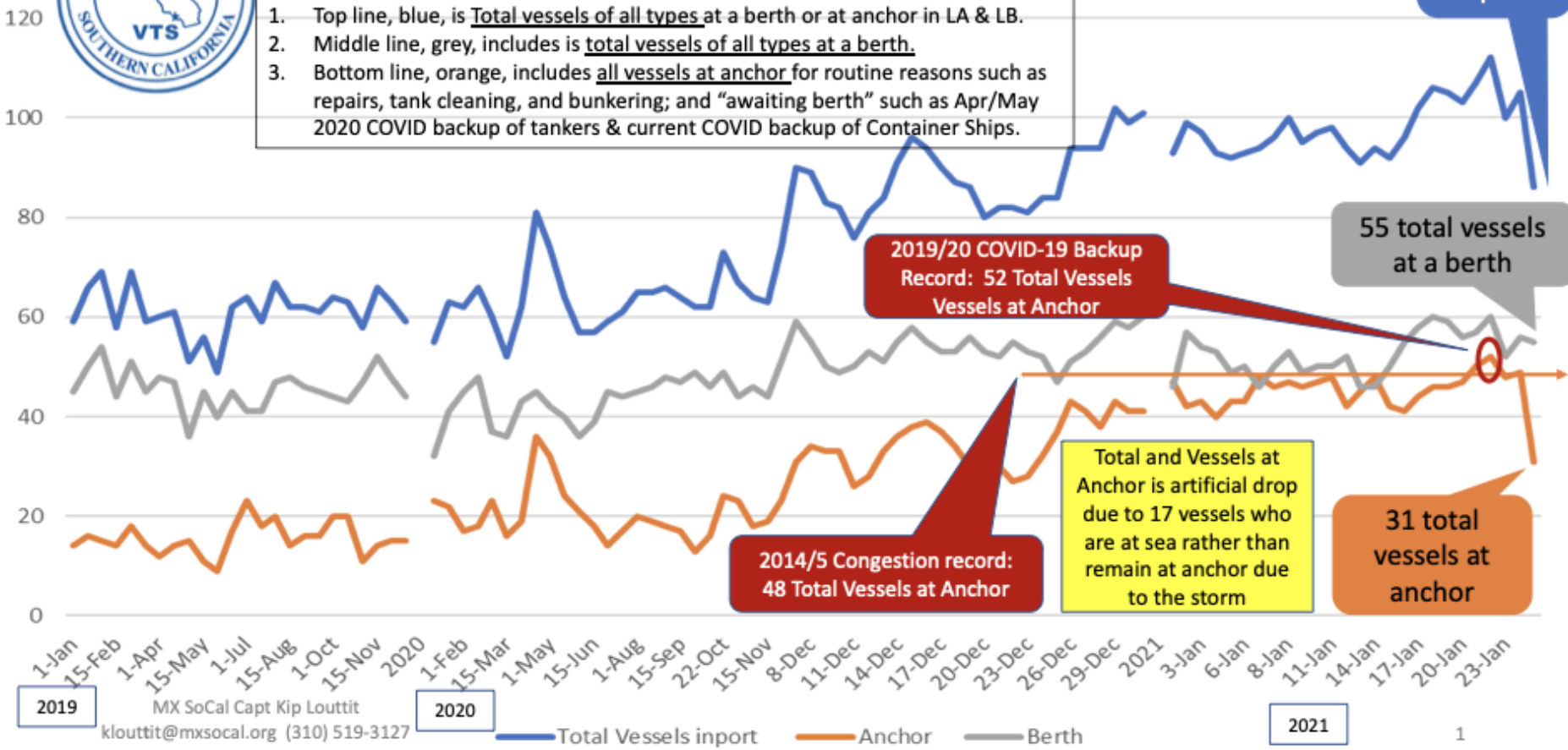
How can we predict this pitch motion and ensure a safe passage?

Captain Kip Louttit



## Total Vessels of all Types in Los Angeles and Long Beach 1 Jan 2019 through 25 Jan 2021 per 1500 report

1. Top line, blue, is Total vessels of all types at a berth or at anchor in LA & LB.
2. Middle line, grey, includes total vessels of all types at a berth.
3. Bottom line, orange, includes all vessels at anchor for routine reasons such as repairs, tank cleaning, and bunkering; and "awaiting berth" such as Apr/May 2020 COVID backup of tankers & current COVID backup of Container Ships.



86 total vessels inport

55 total vessels at a berth

2019/20 COVID-19 Backup Record: 52 Total Vessels Vessels at Anchor

2014/5 Congestion record: 48 Total Vessels at Anchor

Total and Vessels at Anchor is artificial drop due to 17 vessels who are at sea rather than remain at anchor due to the storm

31 total vessels at anchor

# Marine Exchange of Southern California: Port Traffic

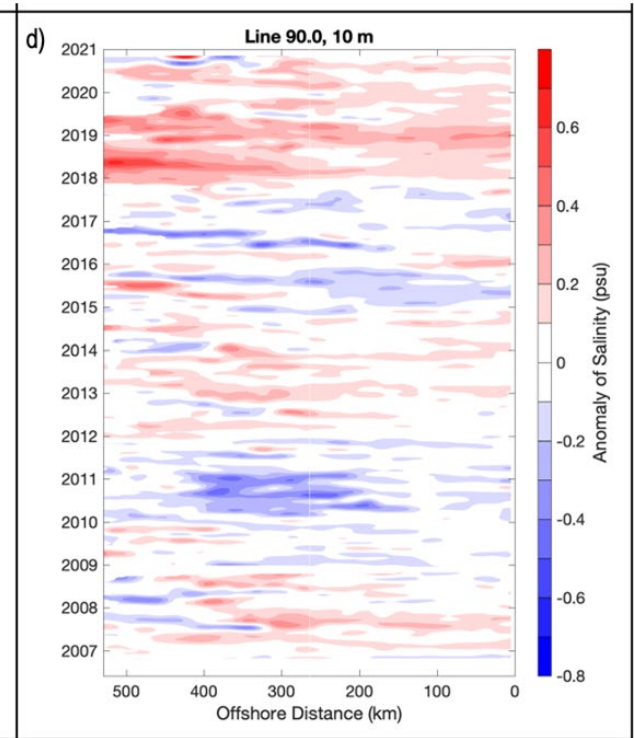
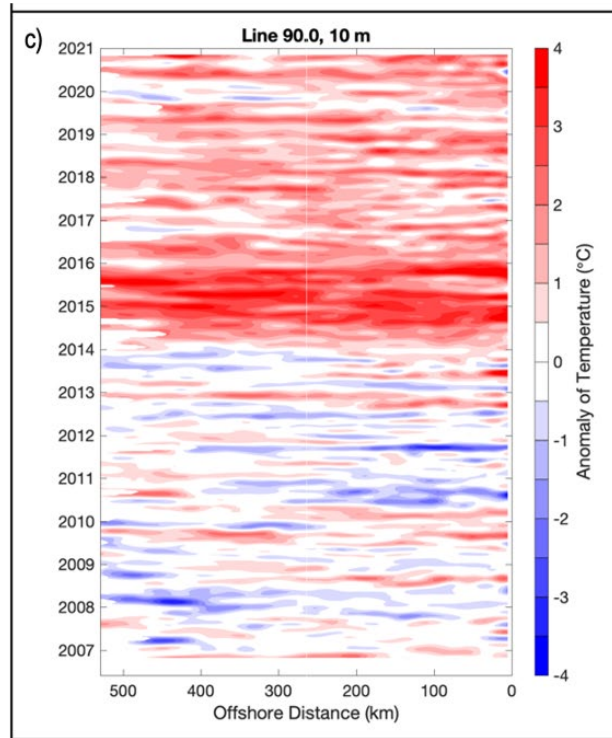
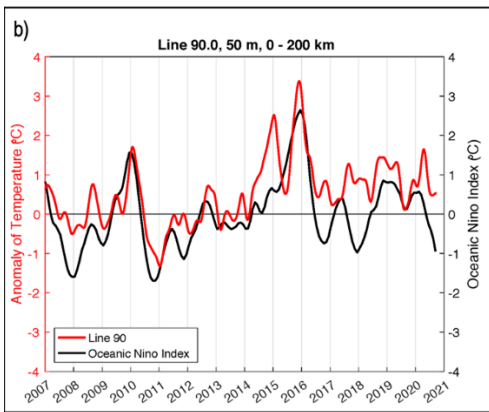
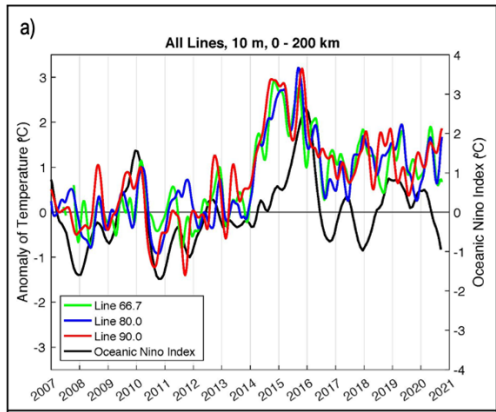


01/21/2021 - Port of Long Beach

Port of LA and LB are the #1 and #2 container ports in the country. Currently experiencing 3 times more vessels waiting for entry to the ports.

Captain Kip Louttit

# California Underwater Glider Network

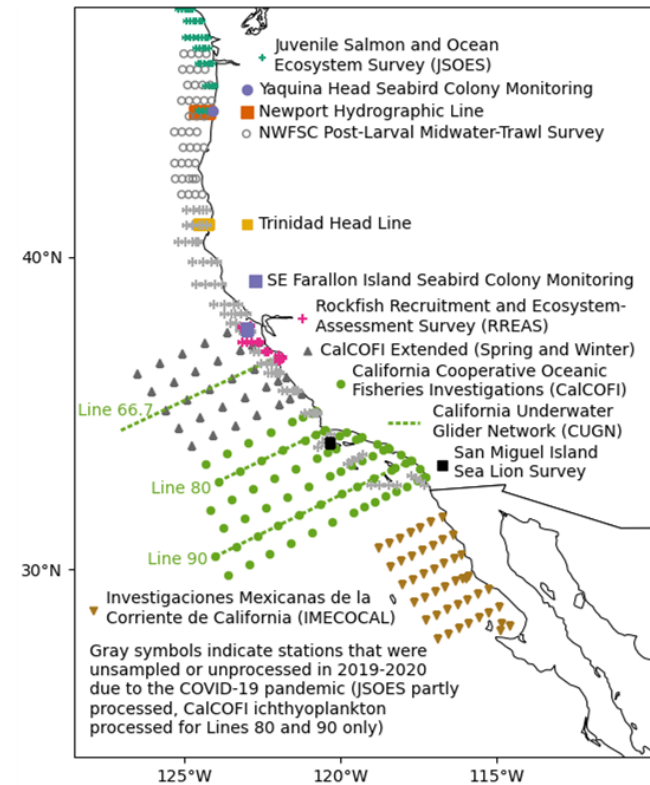


# CalCOFI: Understanding unprecedented changes in the California Current



## State of the California Current 2019-2020 Back to the Future with Marine Heatwaves?

- Marine heatwave offshore & upwelling in northern part of California Current:
- Relatively productive conditions
- Biomass of lipid-rich copepod species increased
- Adult krill size increased
- Several seabird species experienced positive reproductive success
- Mixed fish community
- Anchovies provide important forage base for fish, seabird, and marine mammals



Weber et al. in press



# CalCOFI: Understanding unprecedented changes in the California Current



## *On the horizon: DDT*

- **DDT dumping ground found off of Southern California in October 2020**
- Exploring the possibility of **using archived CalCOFI samples to understand impacts of DDT**
- Hosted a **DDT working group at the CalCOFI Conference 2020**
- **Pilot project** to assess feasibility

L.A.'s coast was once a DDT dumping ground.





- 
- **Next webinar: Tuesday, April 20<sup>th</sup> 2021**

**THANK YOU!**