NOAA West Watch

Reporting Regional Environmental Conditions & Impacts in the West

April 20, 2021

DRI
Desert Research Institute

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Western Regional Climate Center
Providing climate services since 1986

Call Agenda

- Project Recap & Updates (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 Recap and Updates

- 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

- 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).

Current Drought Conditions

U.S. Drought Monitor

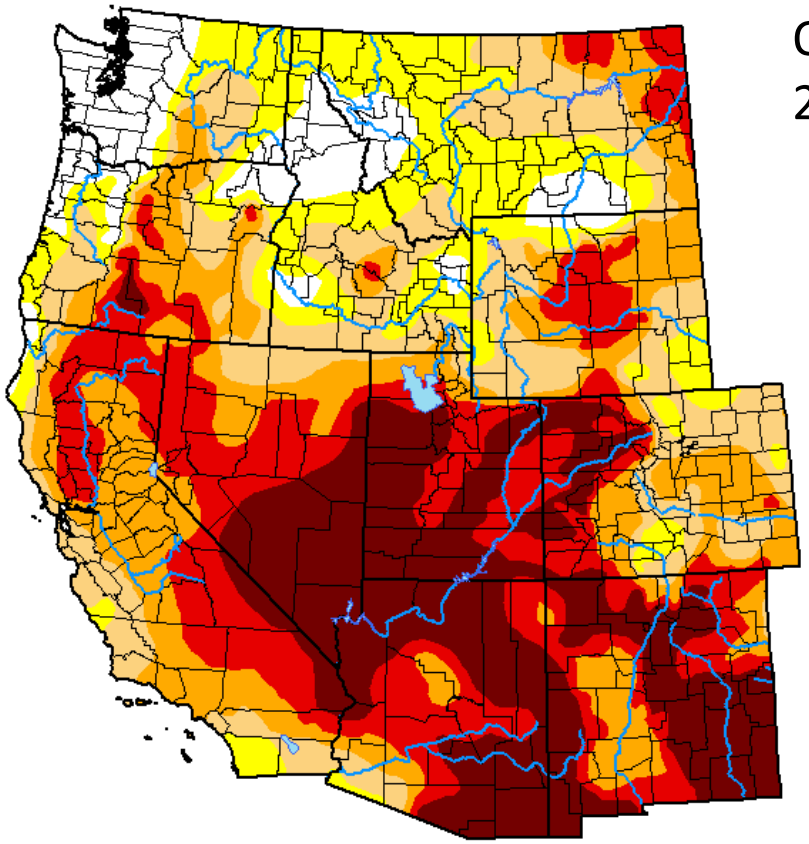
West

April 13, 2021

(Released Thursday, Apr. 15, 2021)

Valid 8 a.m. EDT

Current: 78% D1-D4, 42%D3-D4



One year ago:
27% D1-D4, 0%D3-D4

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

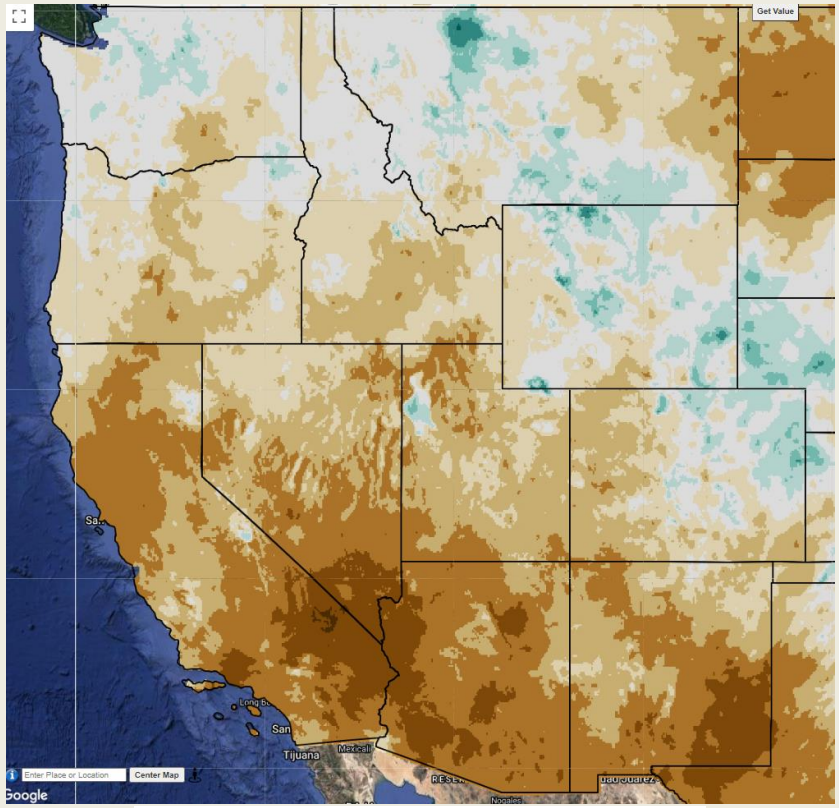
Author:

Deborah Bathke
National Drought Mitigation Center

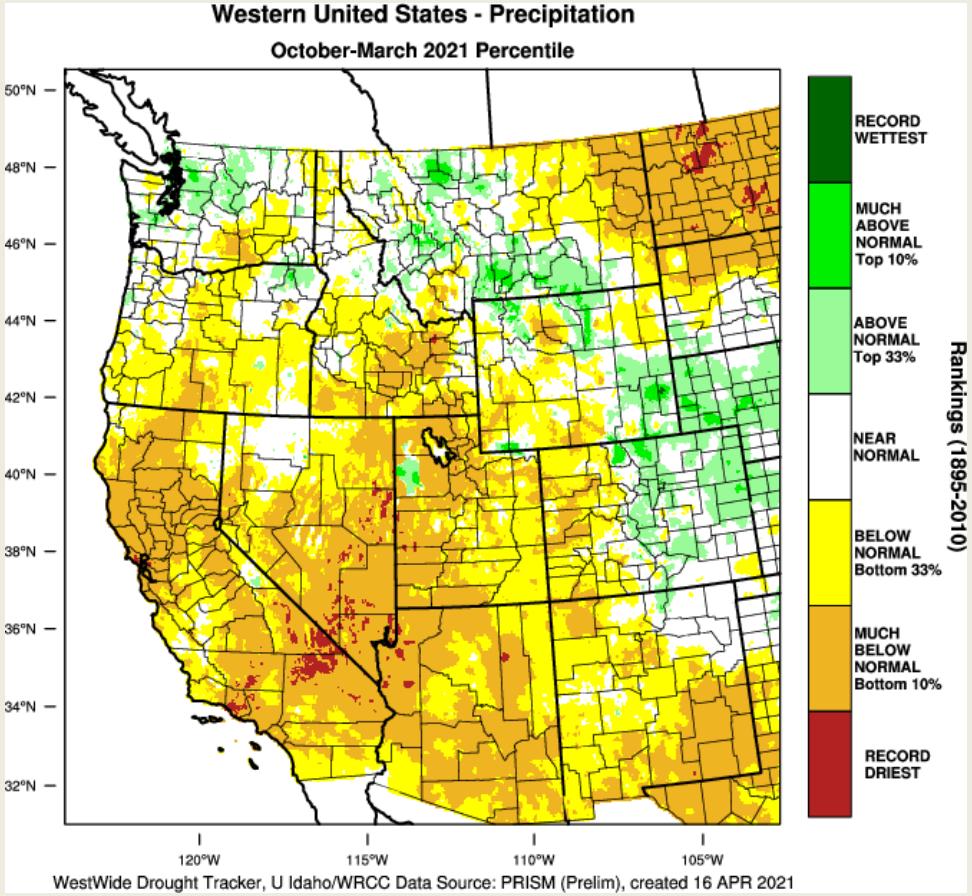
droughtmonitor.unl.edu

Water Year Precipitation

October 1-April 16, 2021
Percent of Average Precipitation



Precipitation Percentile Rankings



https://wrcc.dri.edu/wwdt/

https://app.climateengine.org/climateEngine

Water Year Precipitation – Atmospheric Rivers

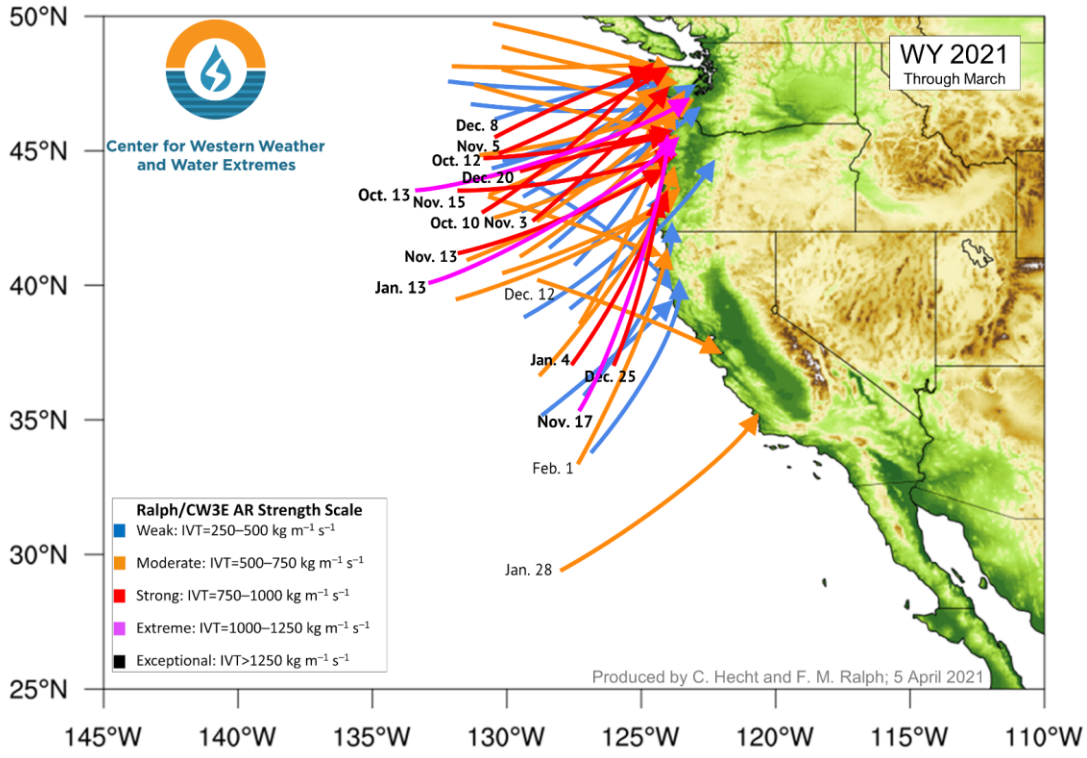
CW3E End of Winter Summary: Meteorological Story

For California DWR's AR Program

AR Strength	AR Count
Weak	15
Moderate	20
Strong	11
Extreme	3
Exceptional	0

Regions Impacted by Each AR	
State/Region	AR Conditions
Washington	45
Oregon	48
Northern CA	30
Central CA	15
Southern CA	6

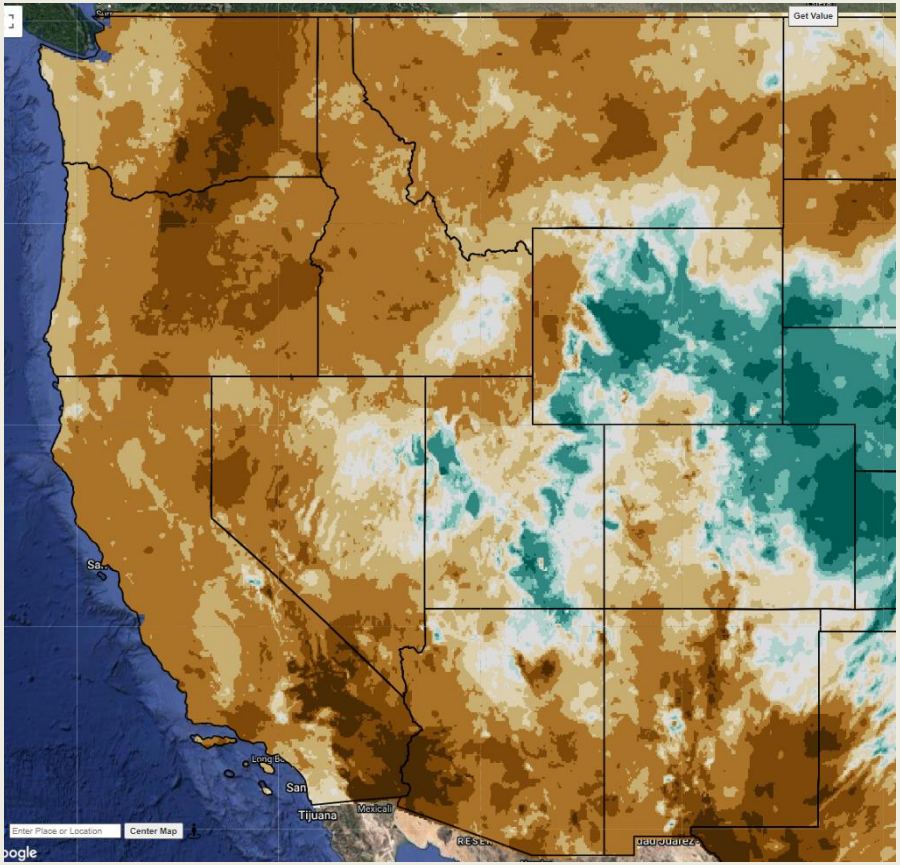
49 atmospheric rivers have made landfall over the U.S. West Coast during WY 2021, a majority of which primarily impacted the Pacific Northwest



*Arrows are placed on the map where each AR was strongest over the coast

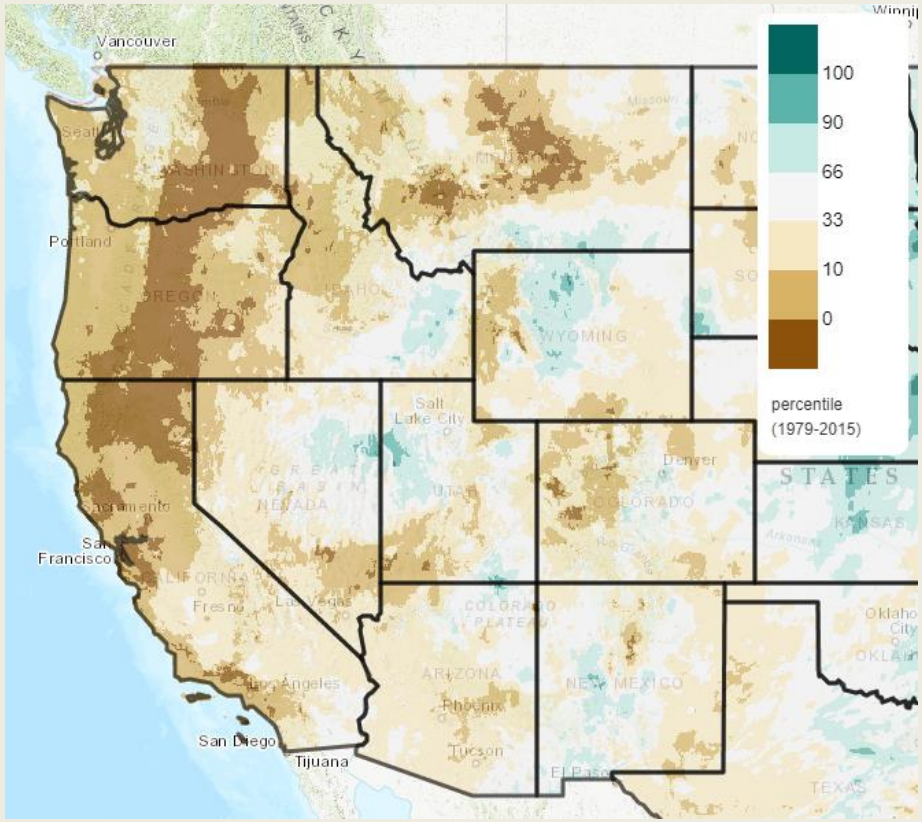
Spring Precipitation

March 1-April 16, 2021
Percent of Average Precipitation



https://app.climateengine.org/climateEngine

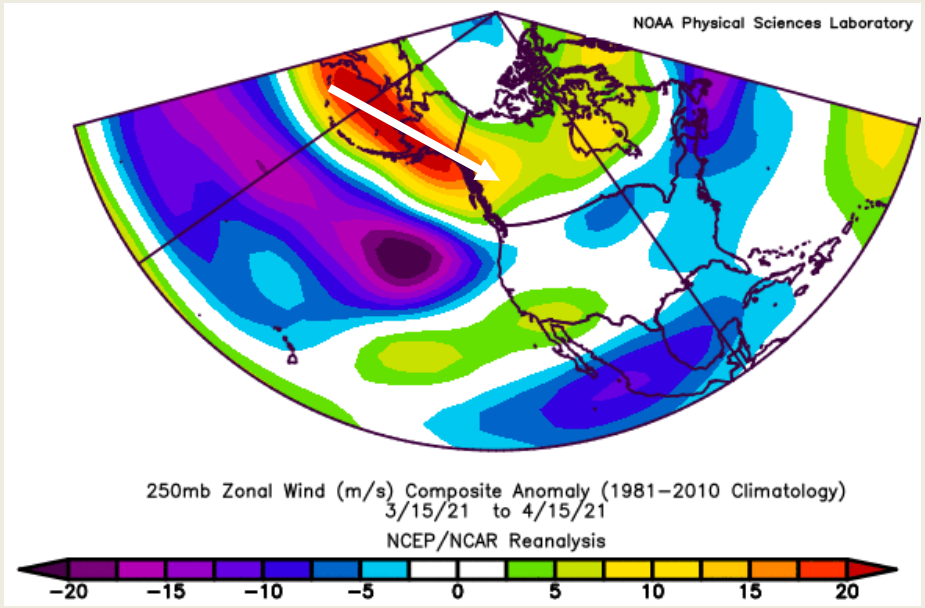
March 19-April 16, 2021
Precipitation Percentile Rankings



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

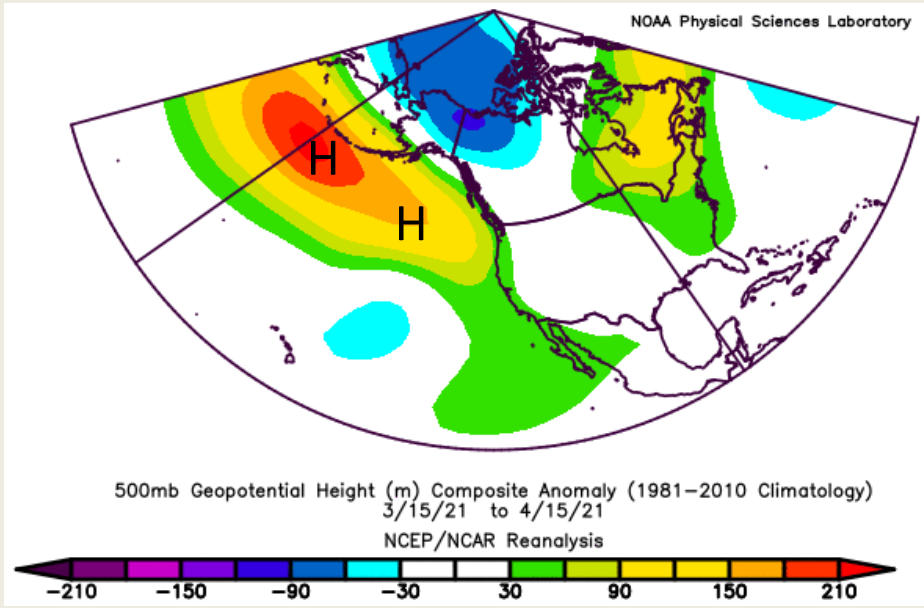
Atmospheric Circulation Patterns: March 15-April 15

Jet Stream Level Zonal (west-to-east) Wind Anomaly



- Polar jet displaced north into AK and Canada

Mid-atmosphere Pressure Anomaly

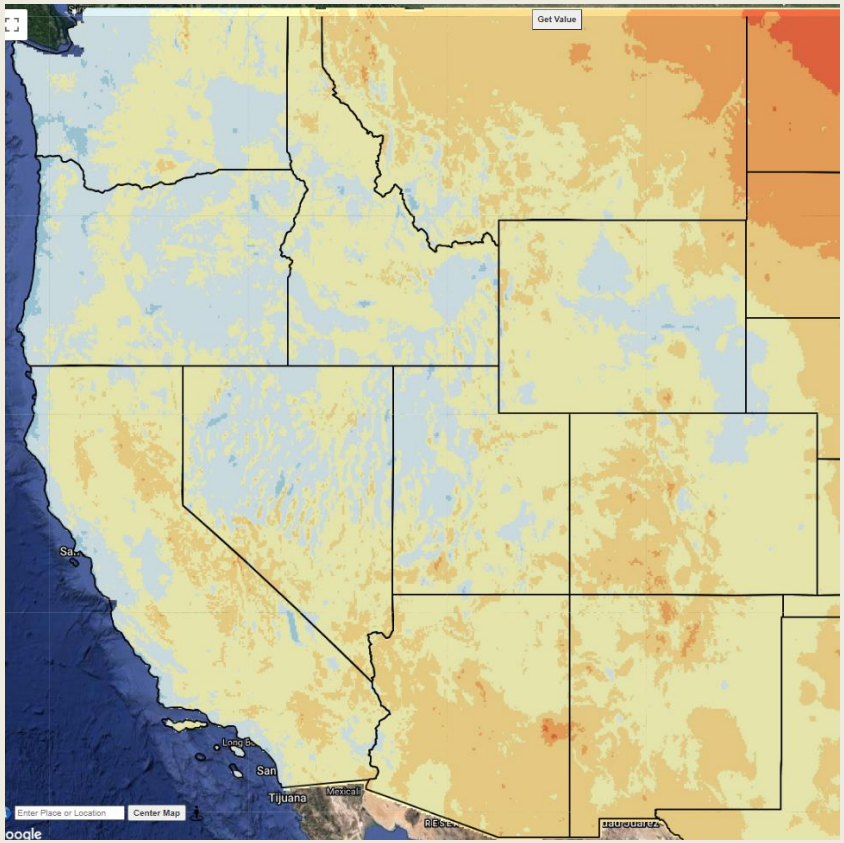


- Large ridge of high pressure (H) extending to the PNW coast

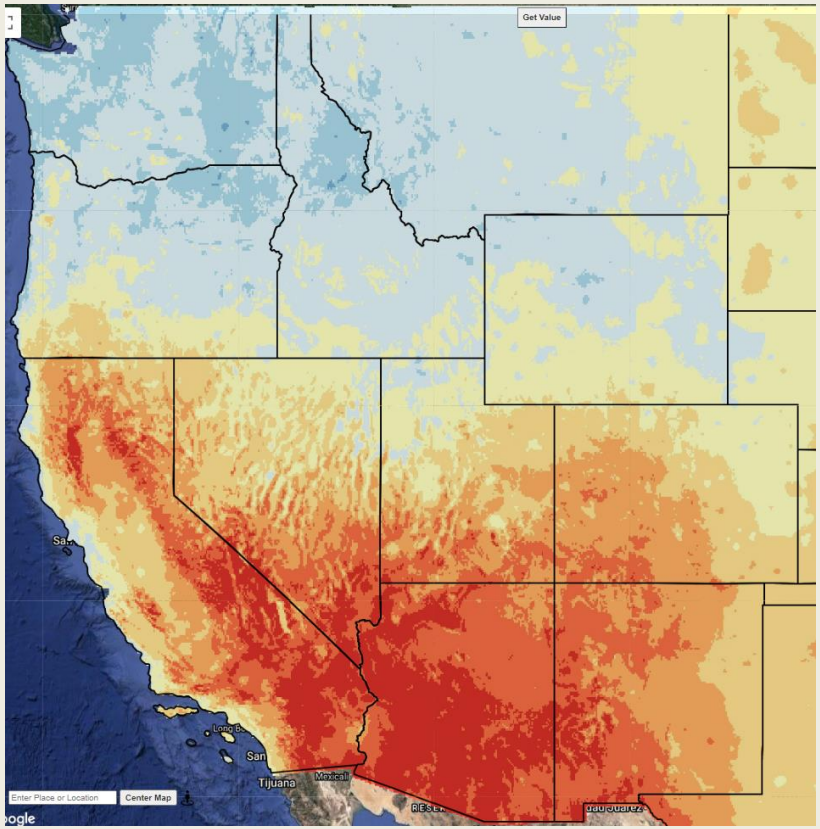
https://psl.noaa.gov/data/composites/day/

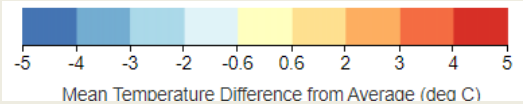
Spring Temperatures

March 1-April 16, 2021
Mean Temperatures Departures



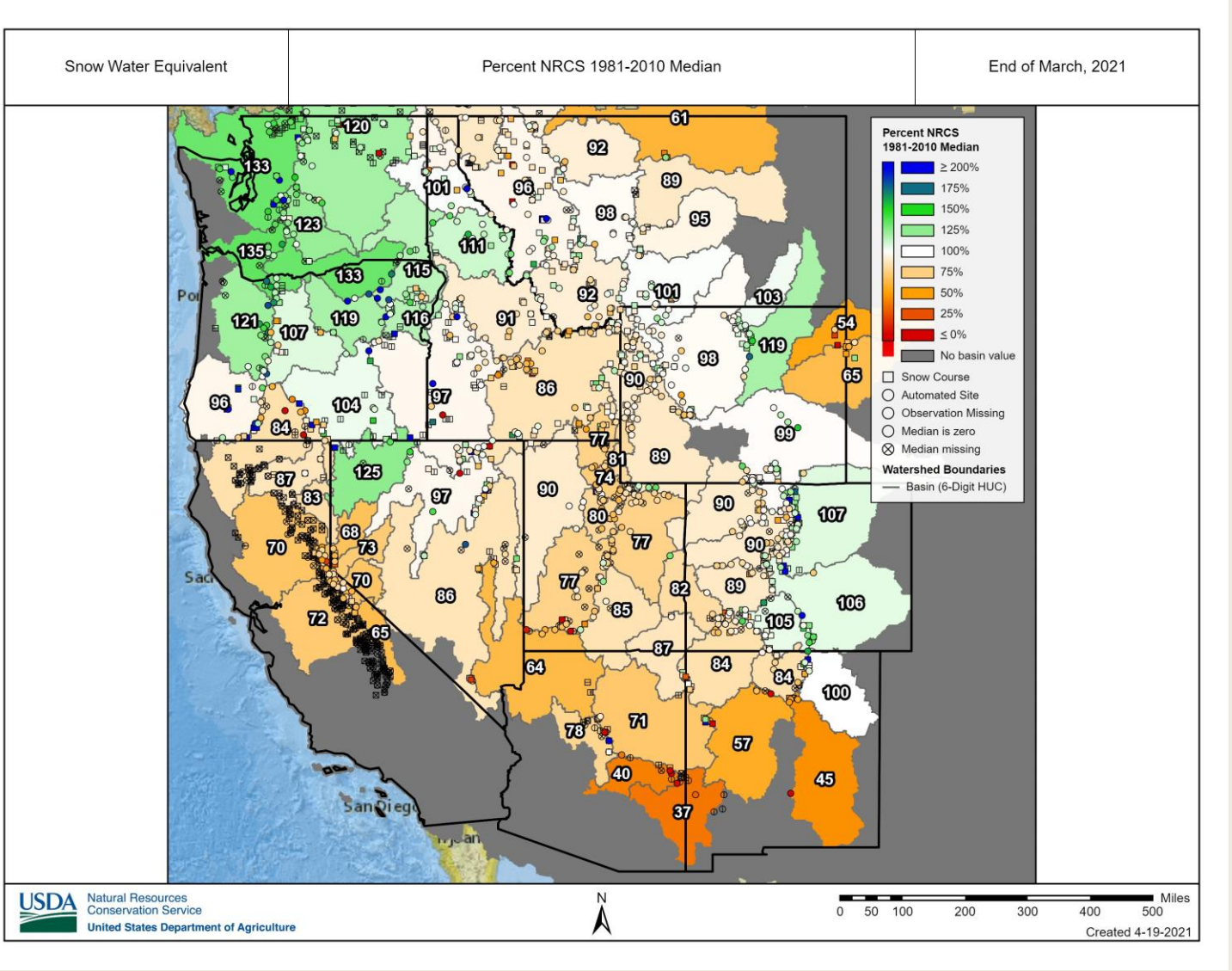
April 1-16, 2021
Mean Temperatures Departures



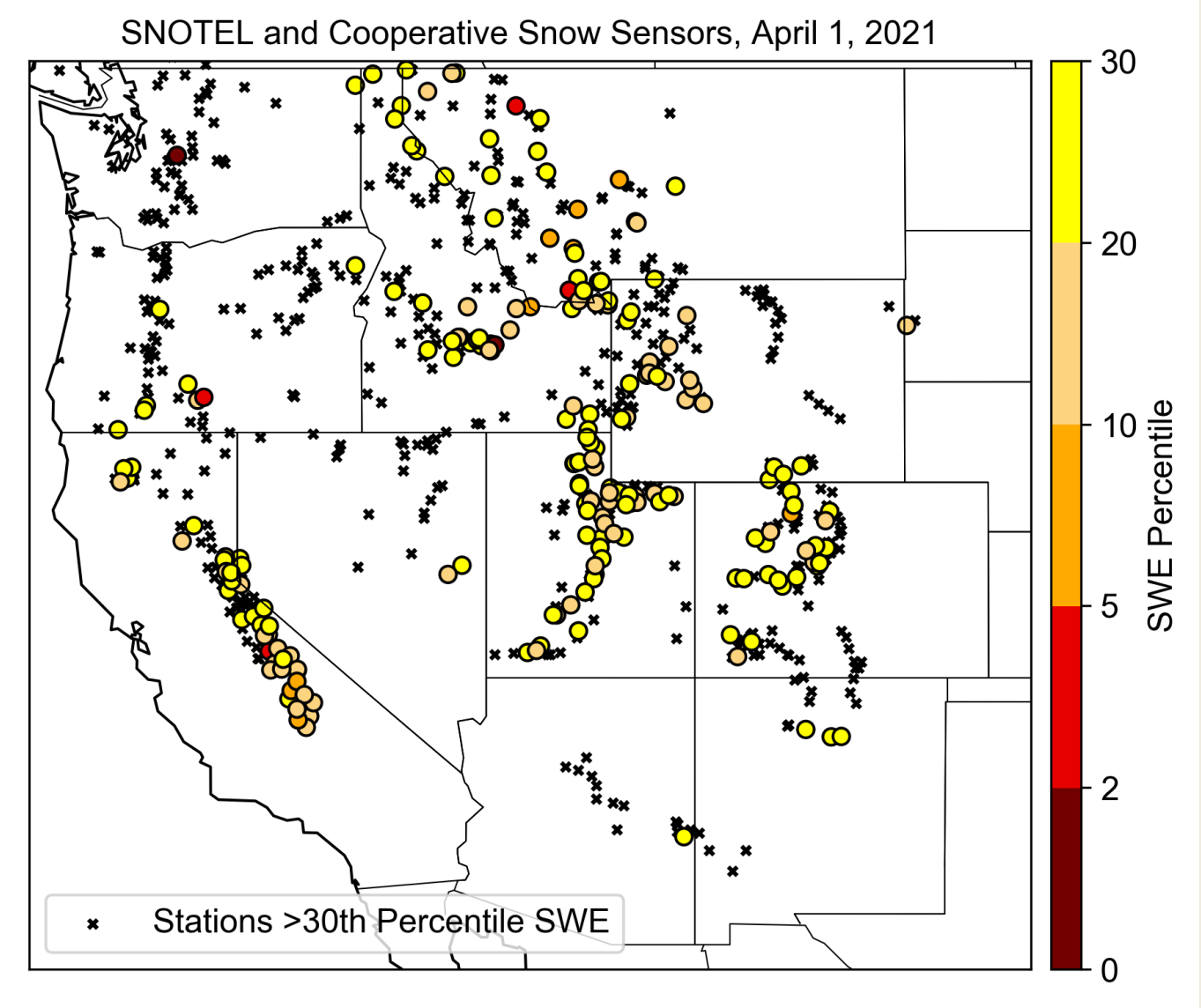


https://app.climateengine.org/climateEngine

April 1 Snowpack



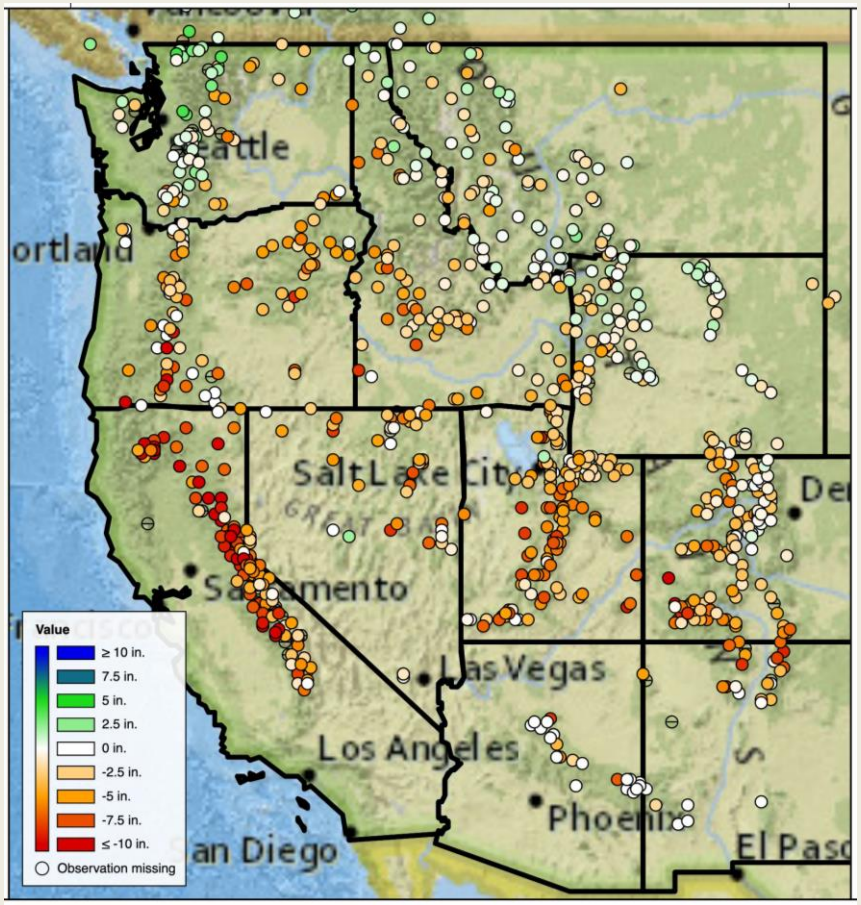
April 1 Snowpack



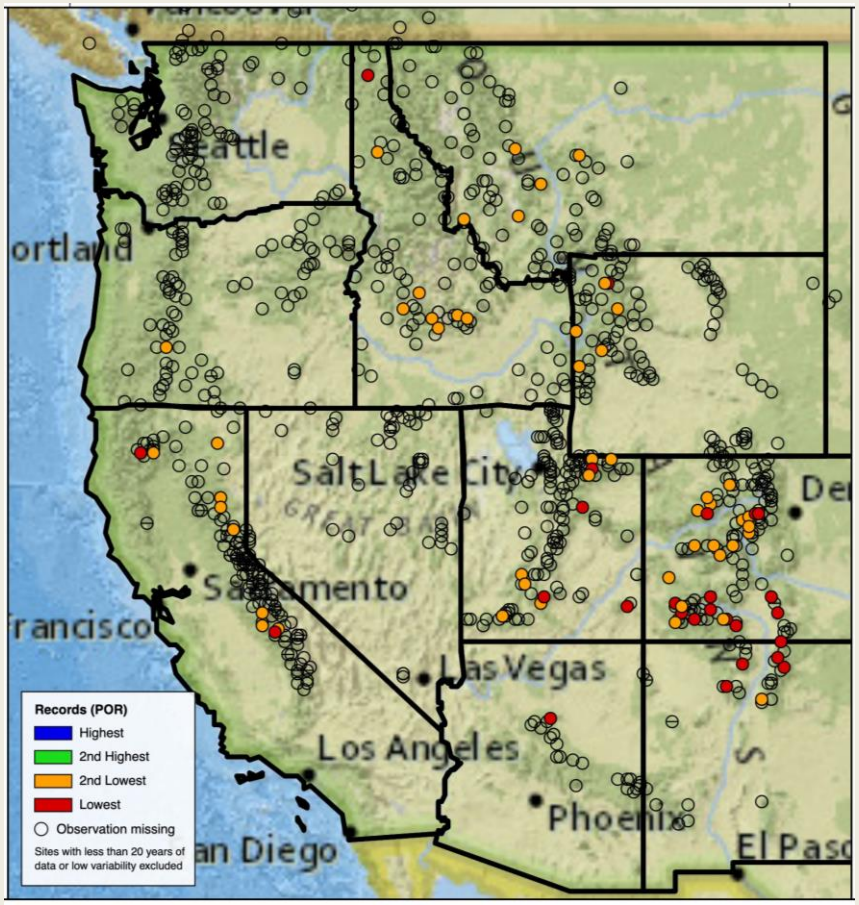
Data: NRCS
Graphic: Dan McEvoy

Record early April Snow Melt

Snow Water Equivalent Change
March 31-April 15

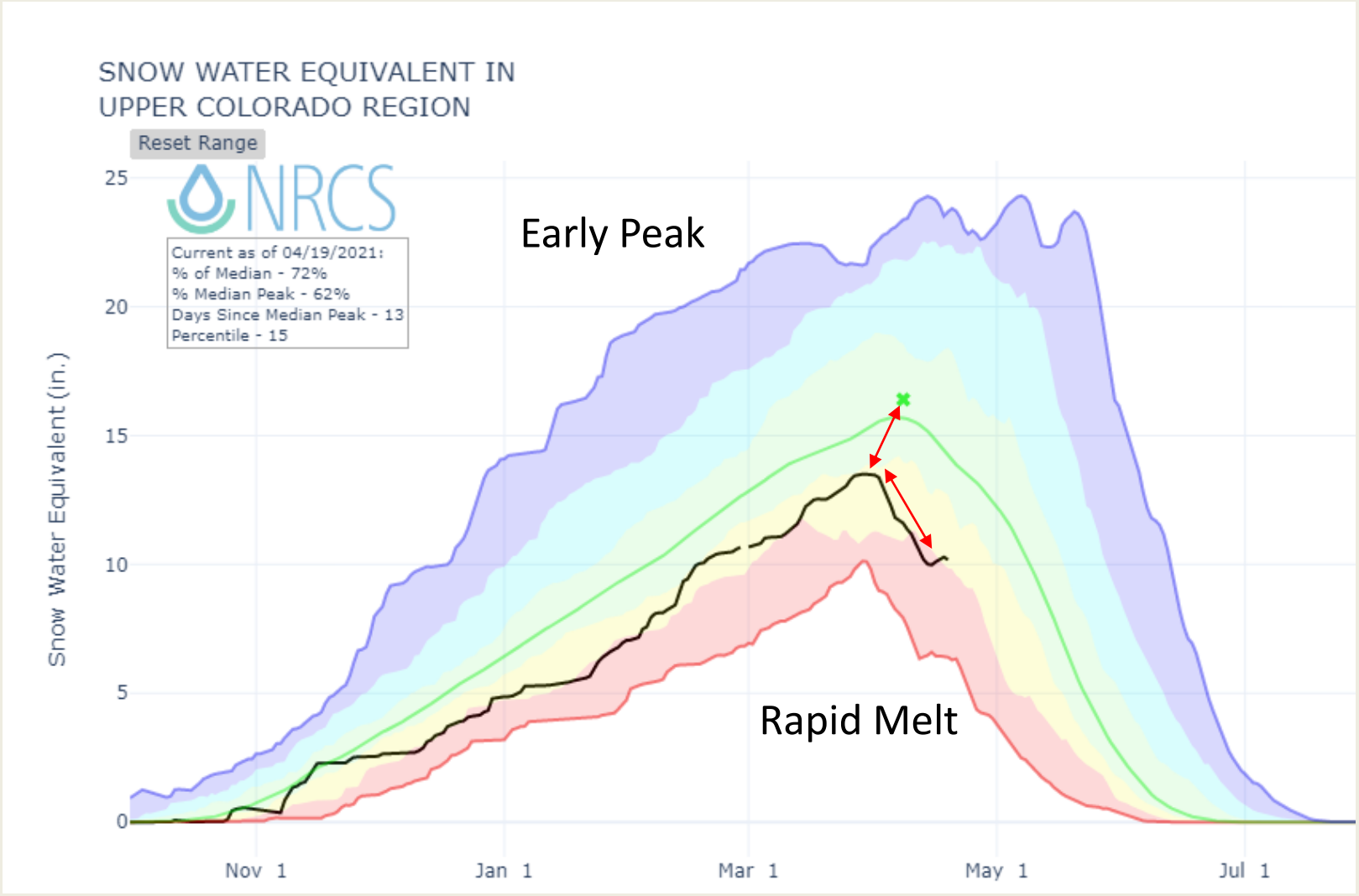


Snow Water Equivalent Change
Records, March 31-April 15



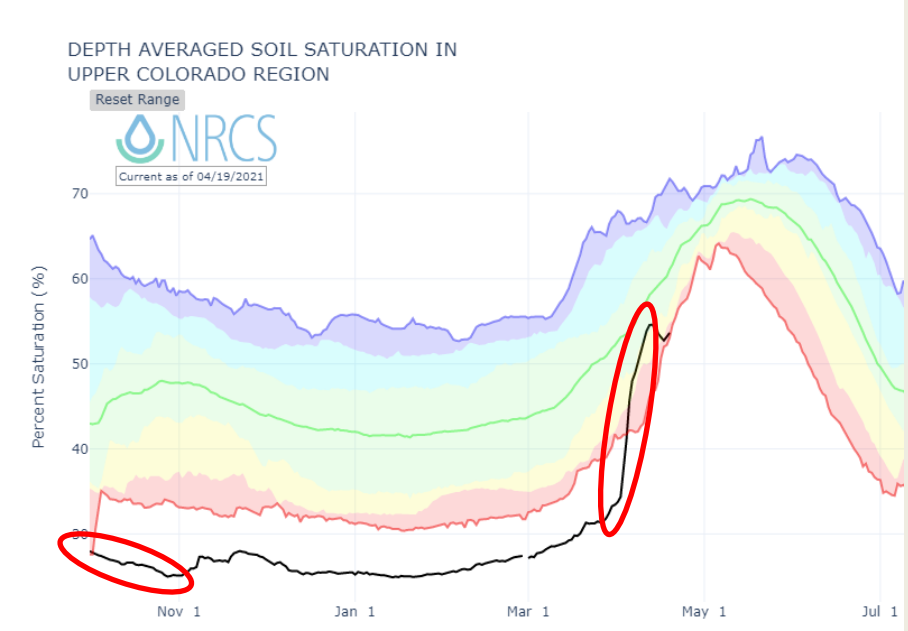
https://www.wcc.nrcs.usda.gov/snow

Upper Colorado River Basin Snow Drought



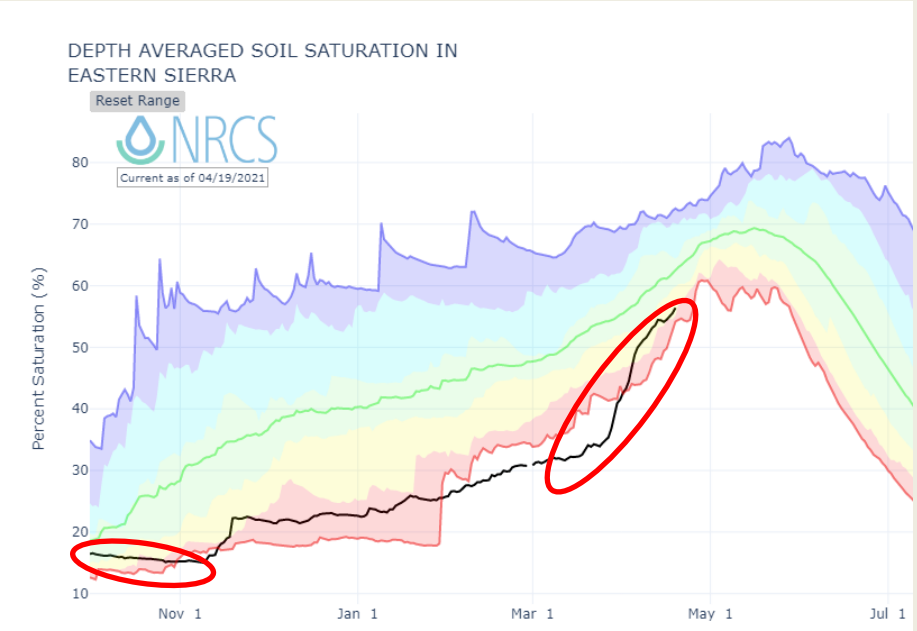
Cascading Impacts: Dry Autumn + Snow Drought

Upper Colorado



- Based on soil moisture data since 2008

Eastern Sierra Nevada

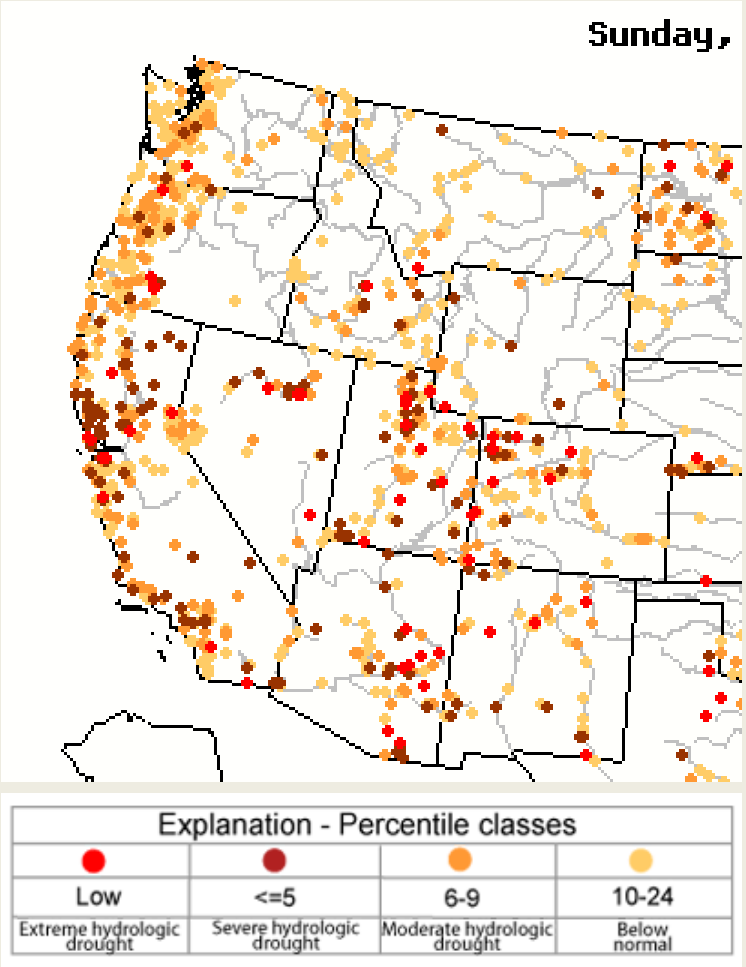


- Based on soil moisture data since 2004

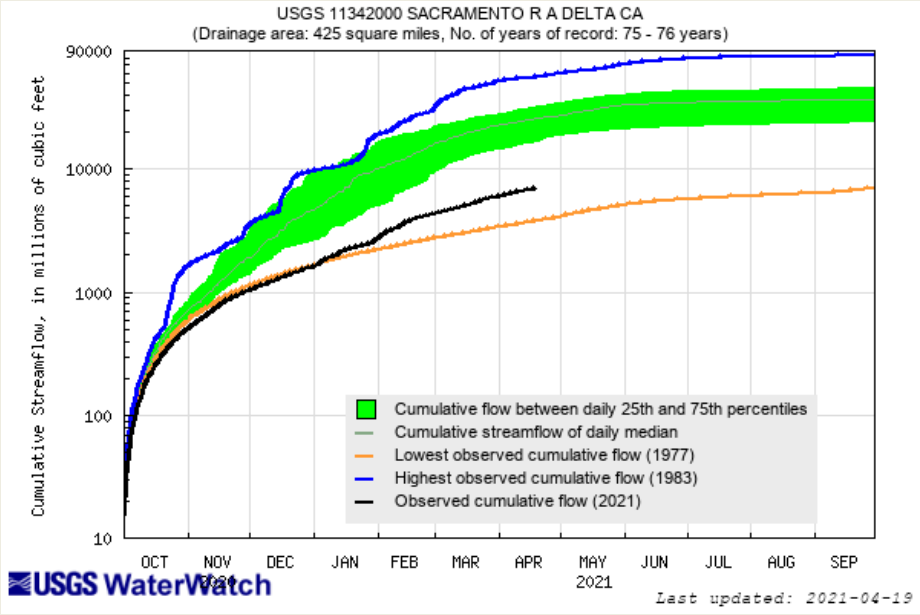
- Extremely dry autumn; almost no wetting of the soils
- Early response to snowmelt with rapid late March/early April warm period

Cascading Impacts: Dry Autumn + Snow Drought

28-day Streamflow Percentiles
April 18, 2021



Cumulative Streamflow
Sacramento River, CA



https://waterwatch.usgs.gov/

Water Supply Concerns Heading into Summer

Western states, including Colorado, prepare for possible 1st water shortage declaration

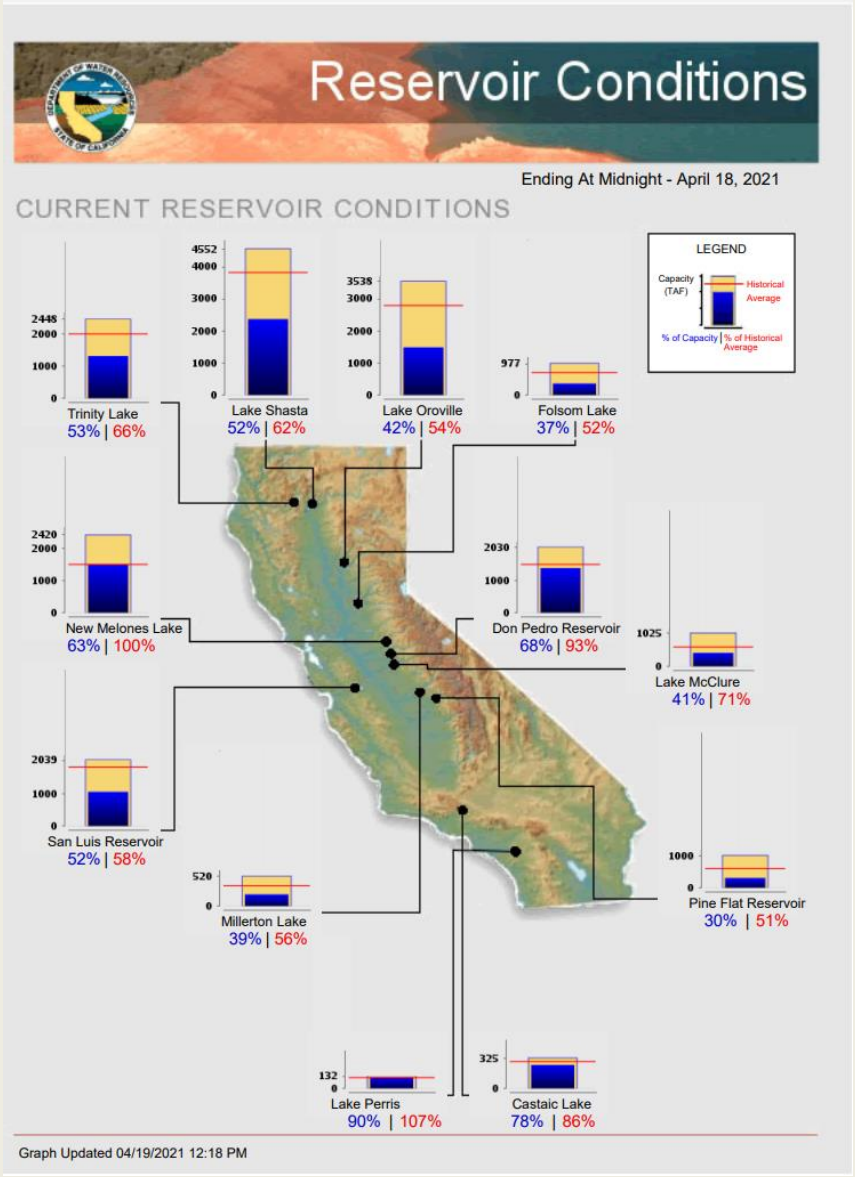
The U.S. Bureau of Reclamation released 24-month projections this week forecasting that less Colorado River water will cascade down from the Rocky Mountains through Lake Powell and Lake Mead

AP The Associated Press 6:57 AM MDT on Apr 18, 2021

The headwaters of the Colorado River flow near Kremmling, above Gore Canyon, on Aug. 13, 2020. (Dave Timko, This American Land)

- Lake Mead projected to fall below 1,075 feet (328 meters) in June 2021
- 1,075 is shortage threshold
- Impacts water deliveries to AZ, CA, CO, NM, UT, and WY
- Lake Powell Apr-Jul inflow forecast: 42% of median

Water Supply Concerns Heading into Summer



California Department of Water Resources Adjusts State Water Project Allocation Following Dry Winter Down to 5% of Requested Supplies

Last Updated: Wednesday, 24 March 2021 06:00
Published: Wednesday, 24 March 2021 06:00

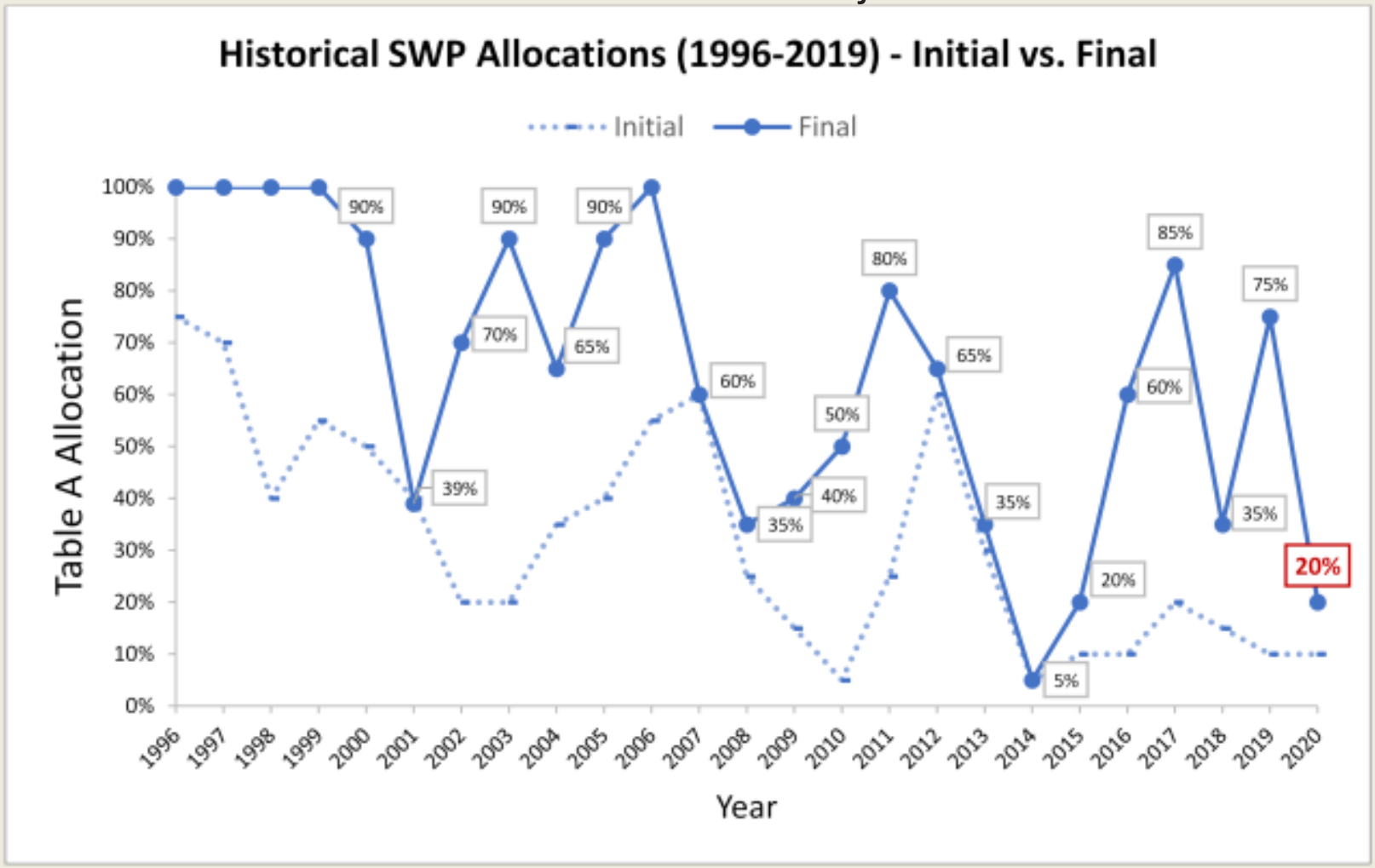
A section of the California Aqueduct within the California State Water Project, located near Wheeler Ridge, which convey California Aqueduct water between Ira J. Chrisman Wind Gap and Edmonston Pumping Plants within Kern County. In the background is the Tehachapi Mountains. DWR/2019

https://goldrushcam.com/sierrasuntimes/

- Final allocation for 2020 was 20%
- Final allocation for 2017 was 85%

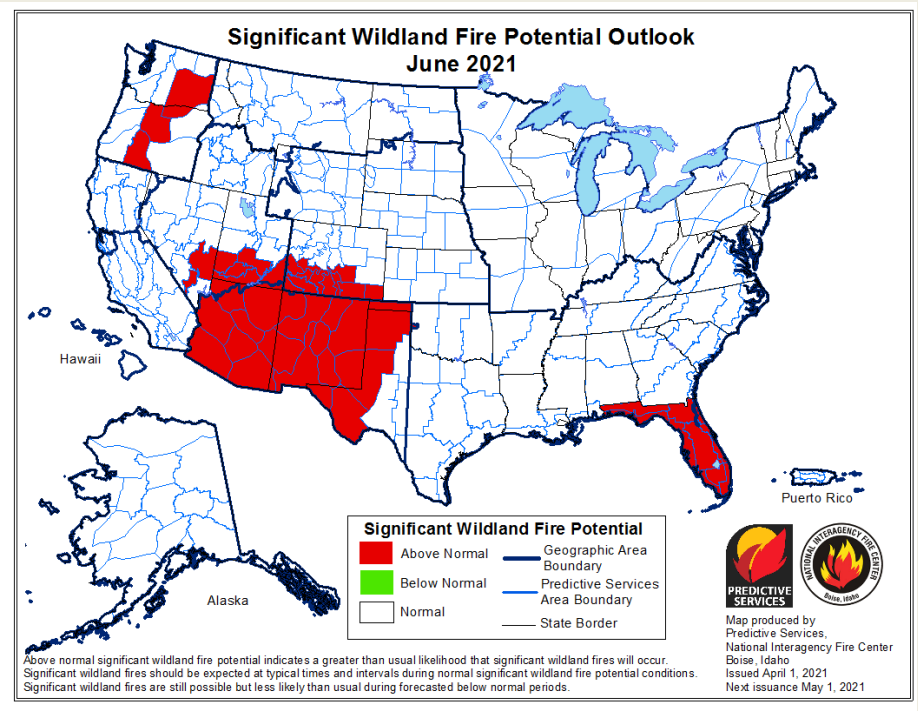
Water Supply Concerns Heading into Summer

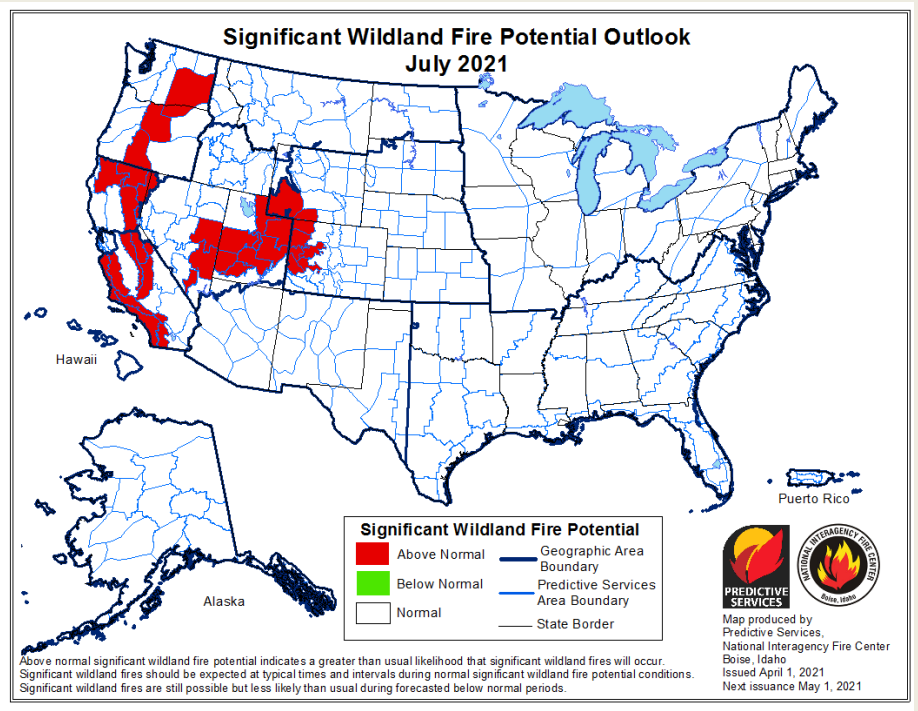
California State Water Project



https://californiawaterblog.com/2020/05/24/an-introduction-to-state-water-project-deliveries/

Drought One Factor in Summer Fire Danger





- Above normal fire potential focused over the Southwest in June and shifting to California, Great Basin, and east of Cascades in July
- One benefit of dry spring is limiting growth of fine fuels (grasses)

ENSO Status April 12, 2021

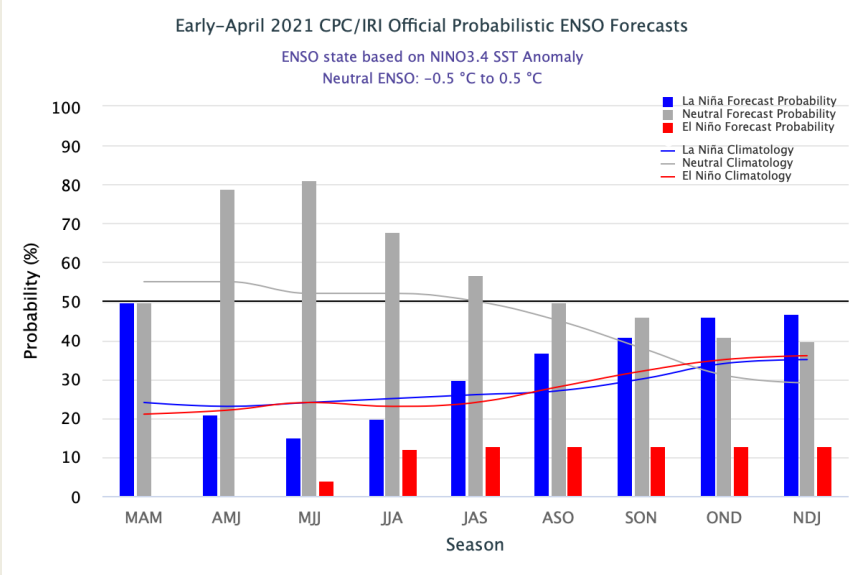
ENSO Alert System Status: La Niña Advisory

- 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.
- A transition from La Niña to ENSO-Neutral is likely in the next month or so, with an 80% chance of ENSO-neutral during May-July 2021.*

Credit: CPC

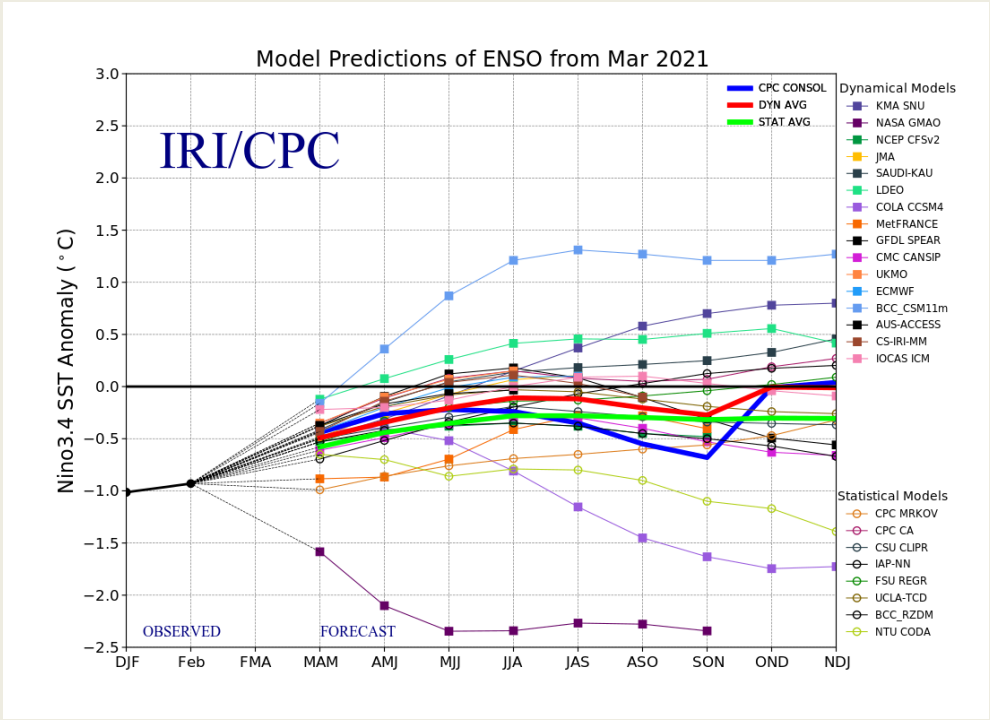
* Note: These statements are updated once a month (2nd Thursday) in association with the ENSO Diagnostics Discussion, which can be found here: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/.

ENSO Forecasts



CPC/IRI El Nino forecast:

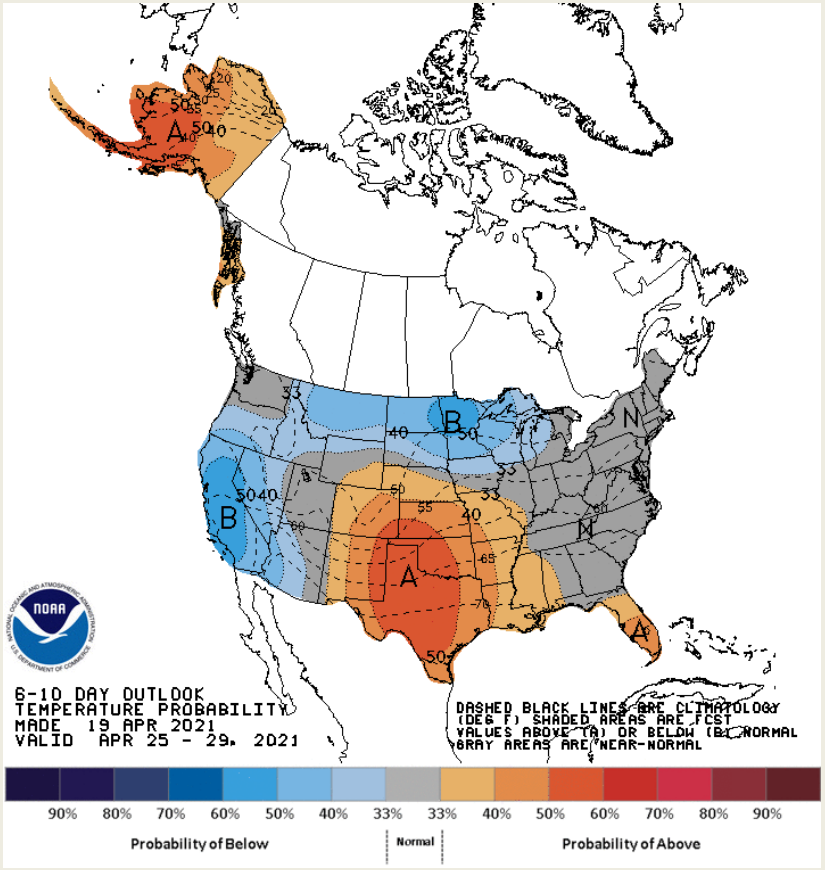
NMME models + other dynamical models + statistical models



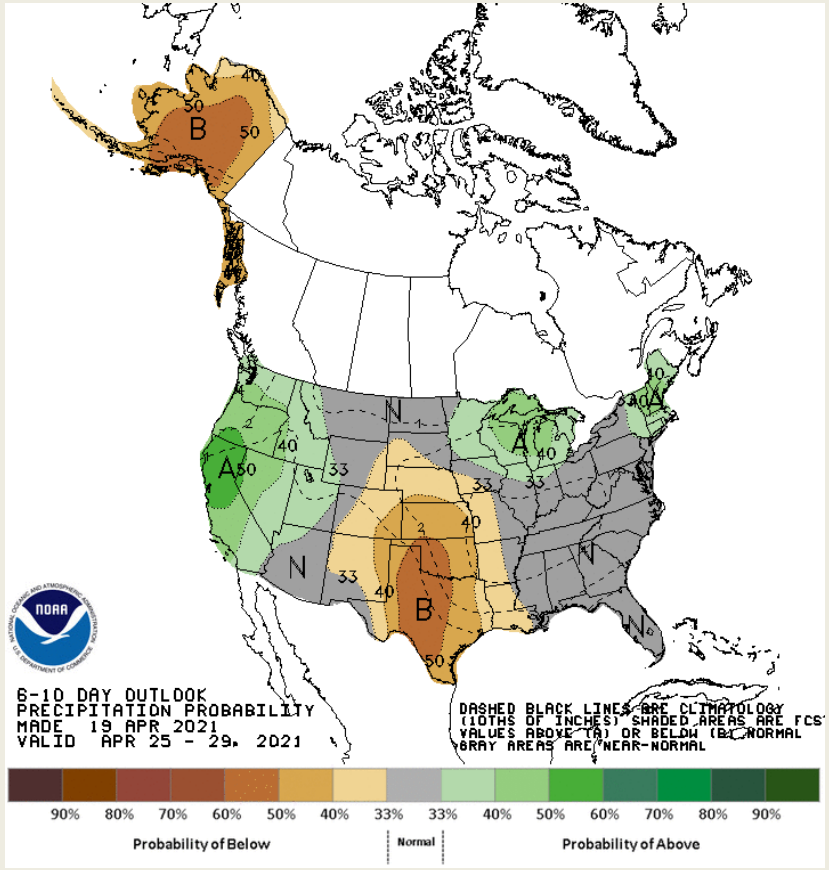
Source: CPC/IRI

April 25-29, 2021 Outlook

Temperature Probability



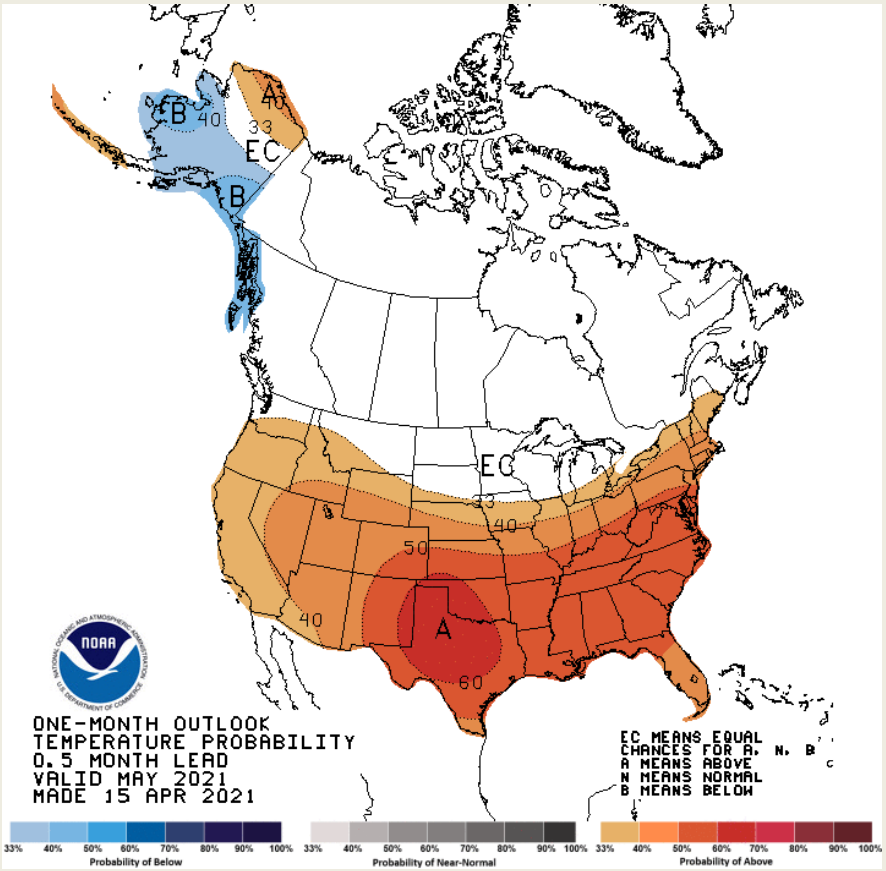
Precipitation Probability



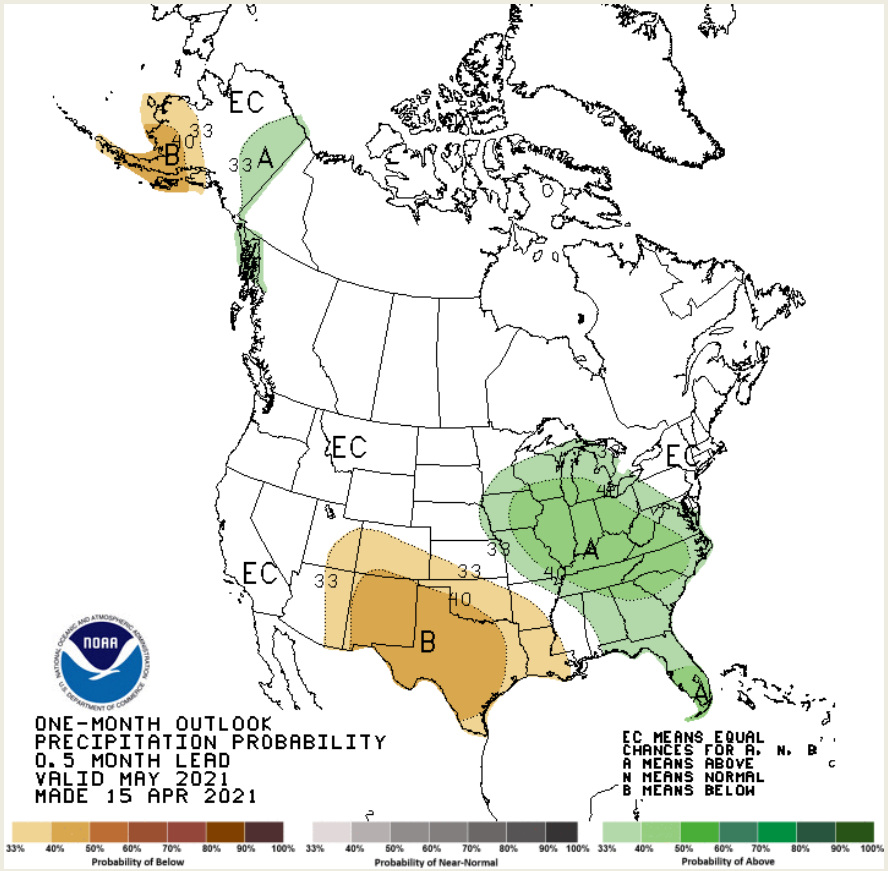
Source: NOAA/CPC

May 2021 Outlook

Temperature Probability

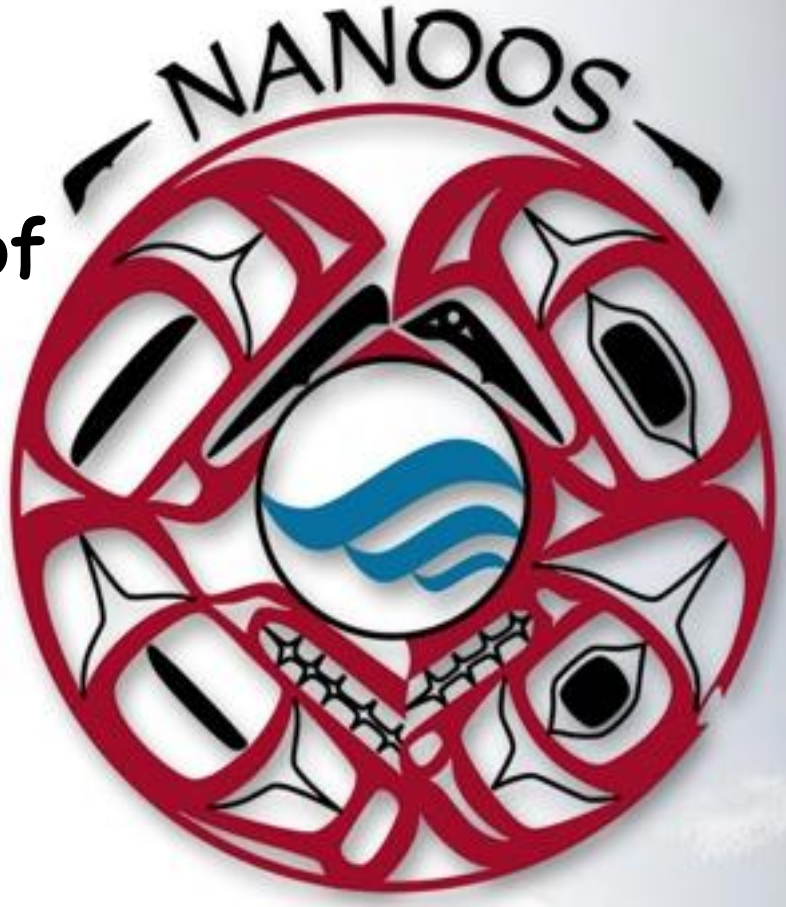


Precipitation Probability



Source: NOAA/CPC

Northwest Association of Networked Ocean Observing Systems



NOAA West Watch Update 20 April 2021: Washington / Oregon Observations

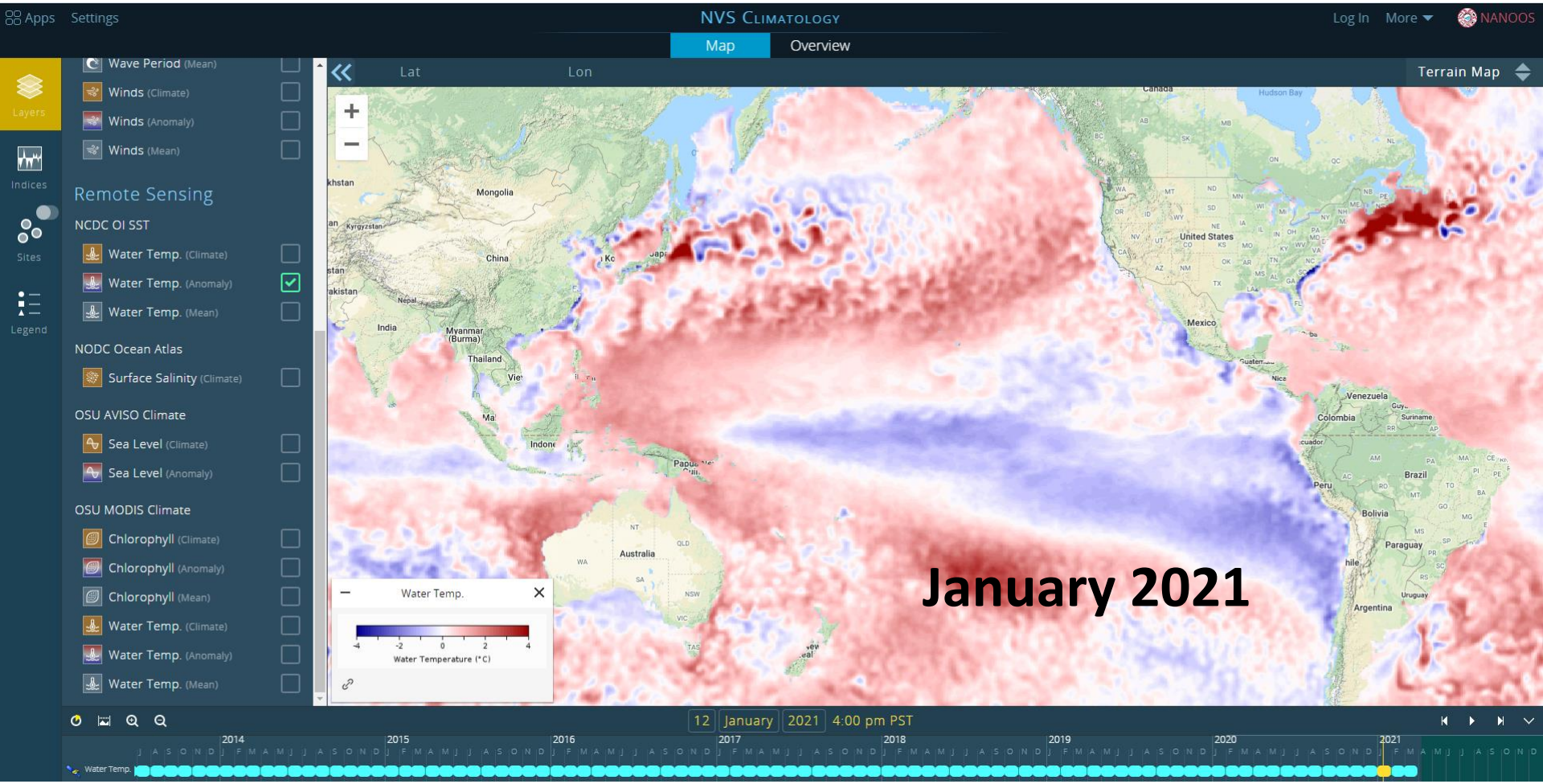
Jan Newton, NANOOS Executive Director

IOOS Integrated Ocean Observing System

www.nanoos.org

NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly
NCDC Optimum Interpolation SST



NANOOS: www.nanoos.org Climatology app

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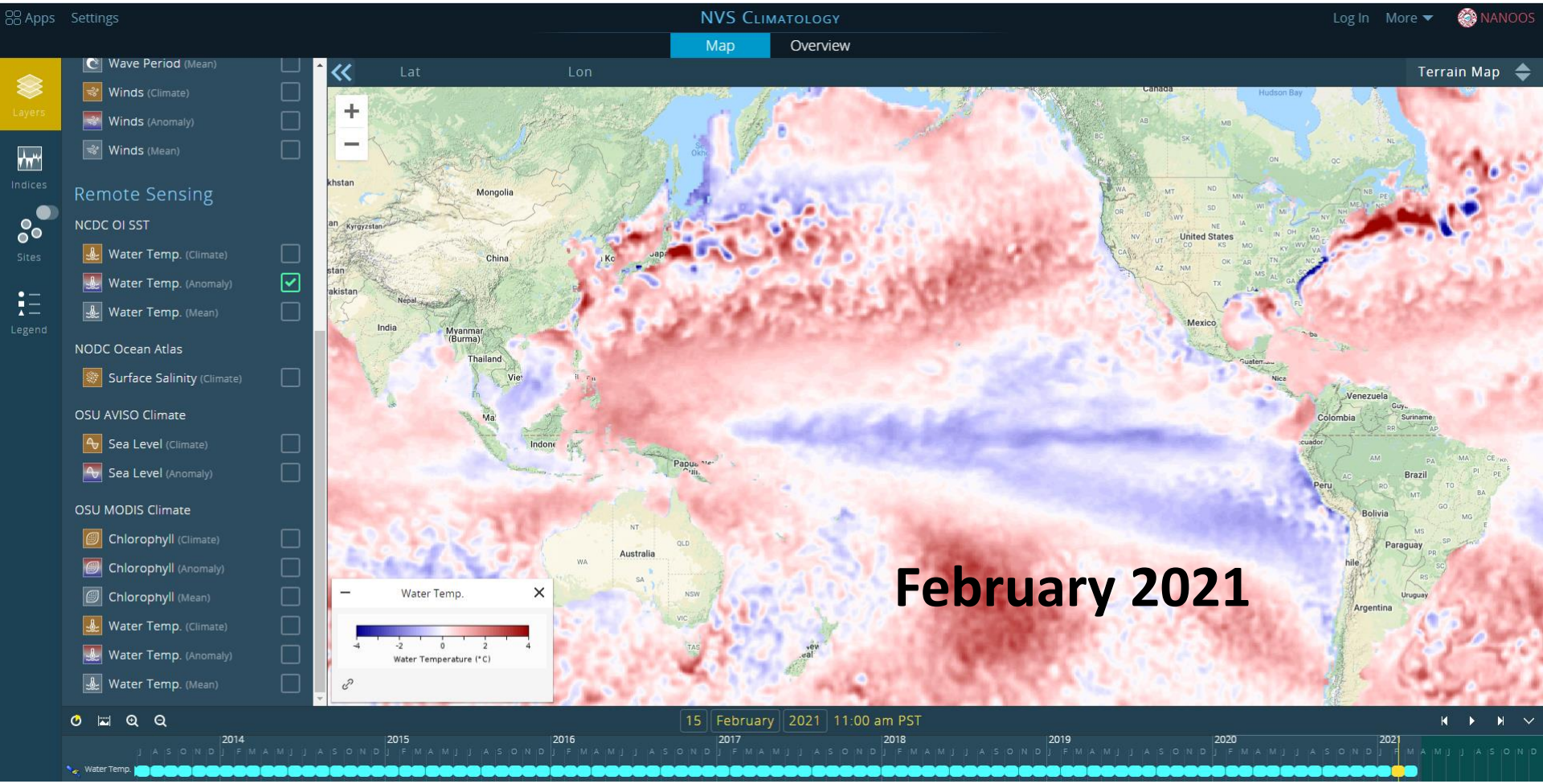
NCDC Optimum Interpolation SST



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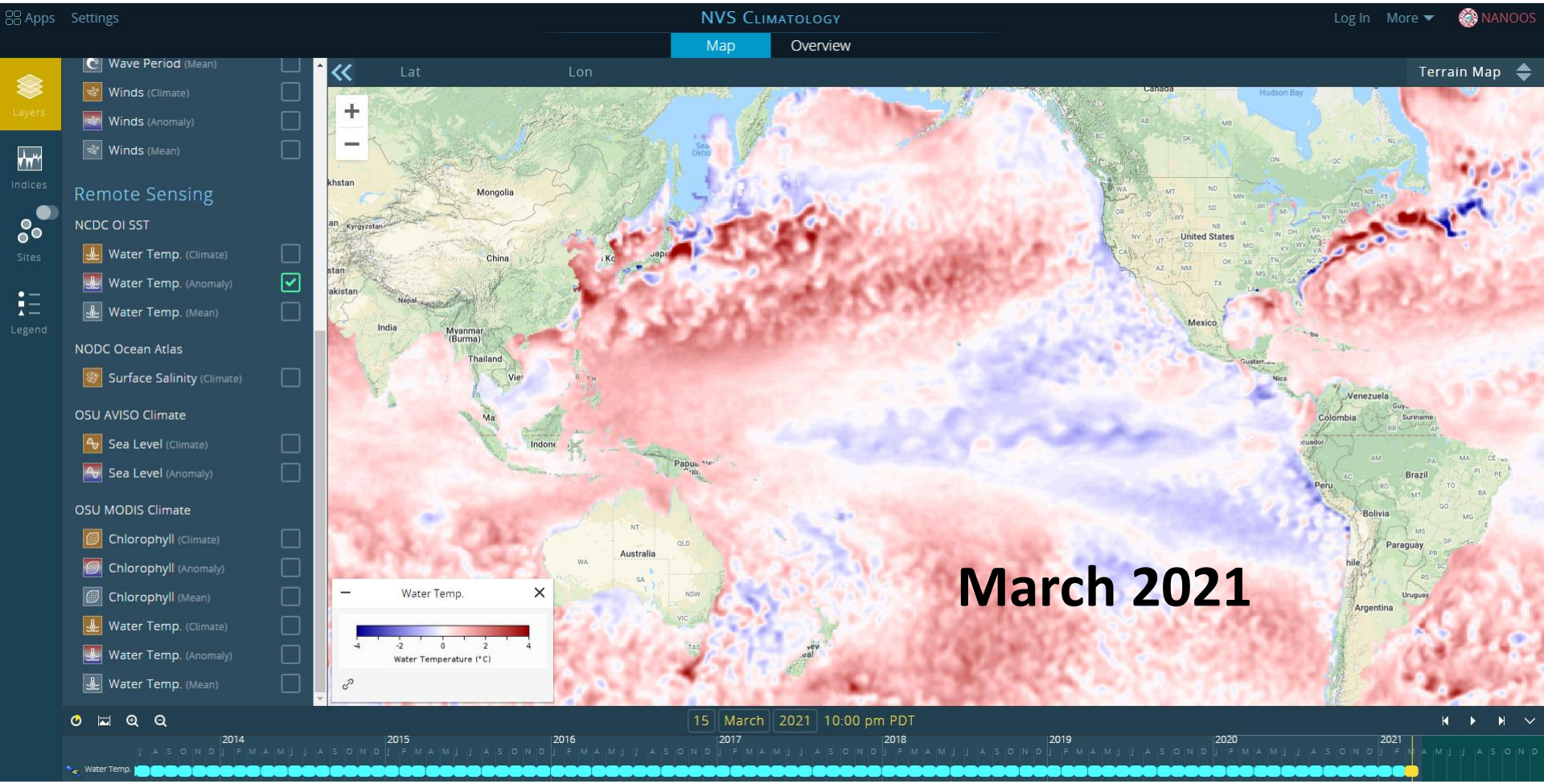
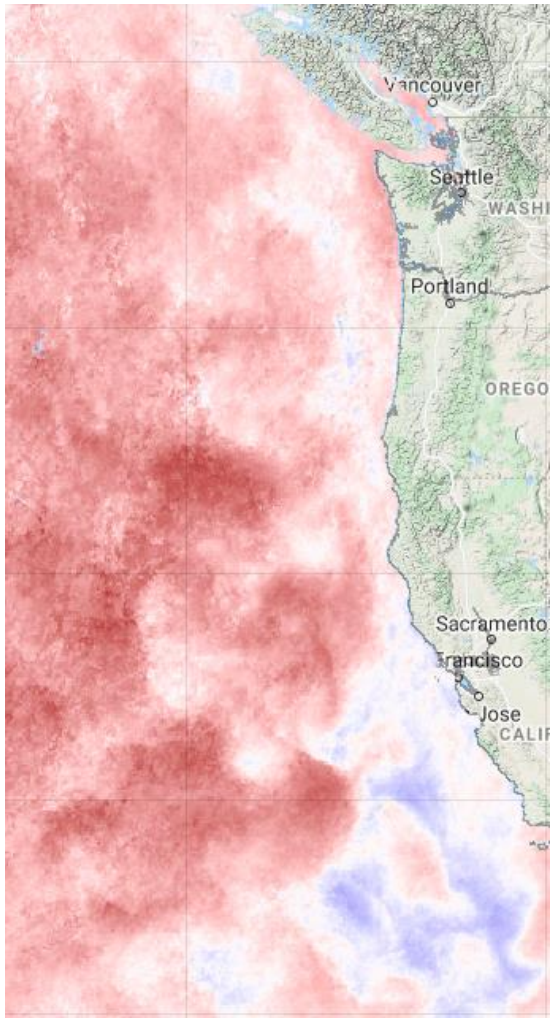
Sea Surface Temperature Anomaly
NCDC Optimum Interpolation SST



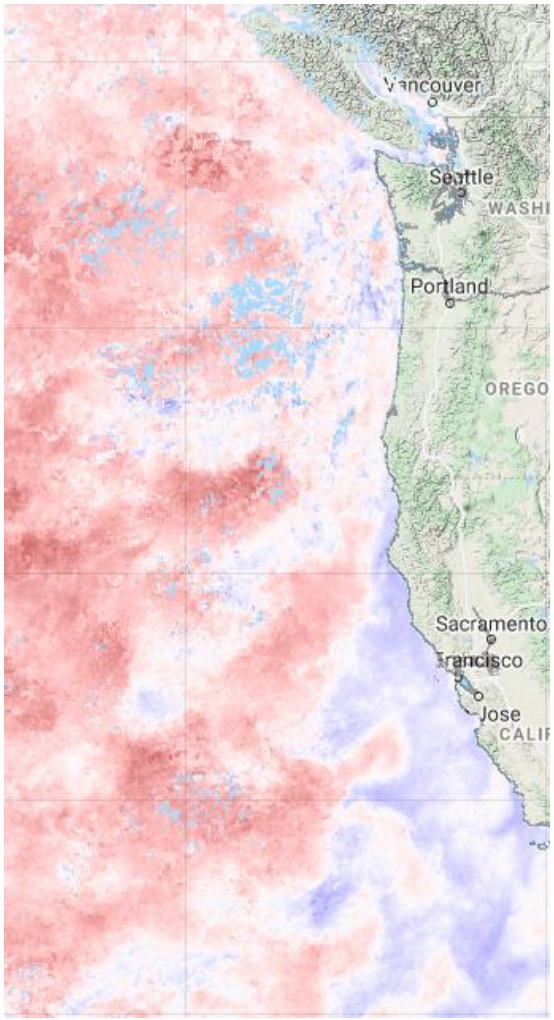
NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly
OSU Modis

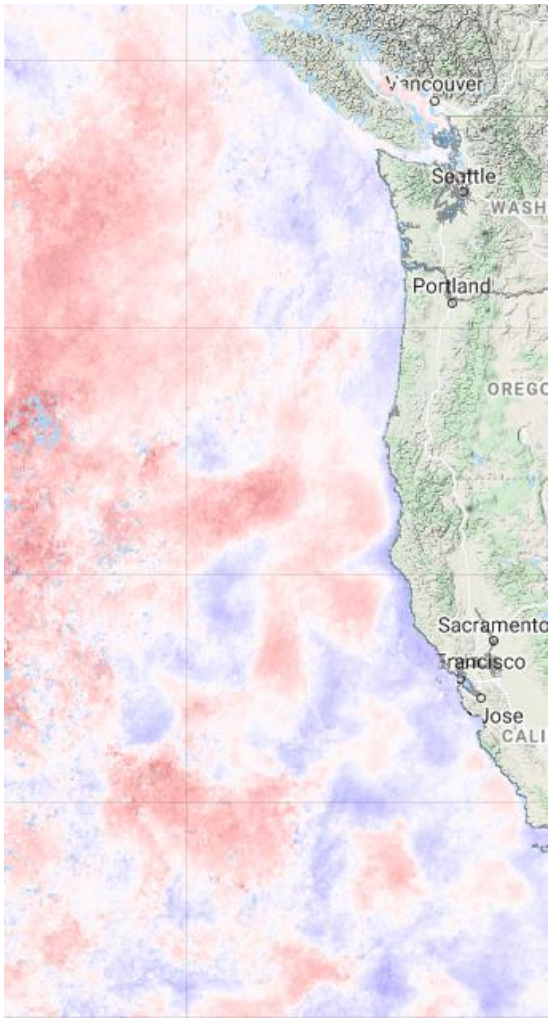
January 2021



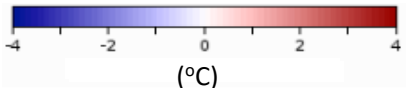
February 2021



March 2021

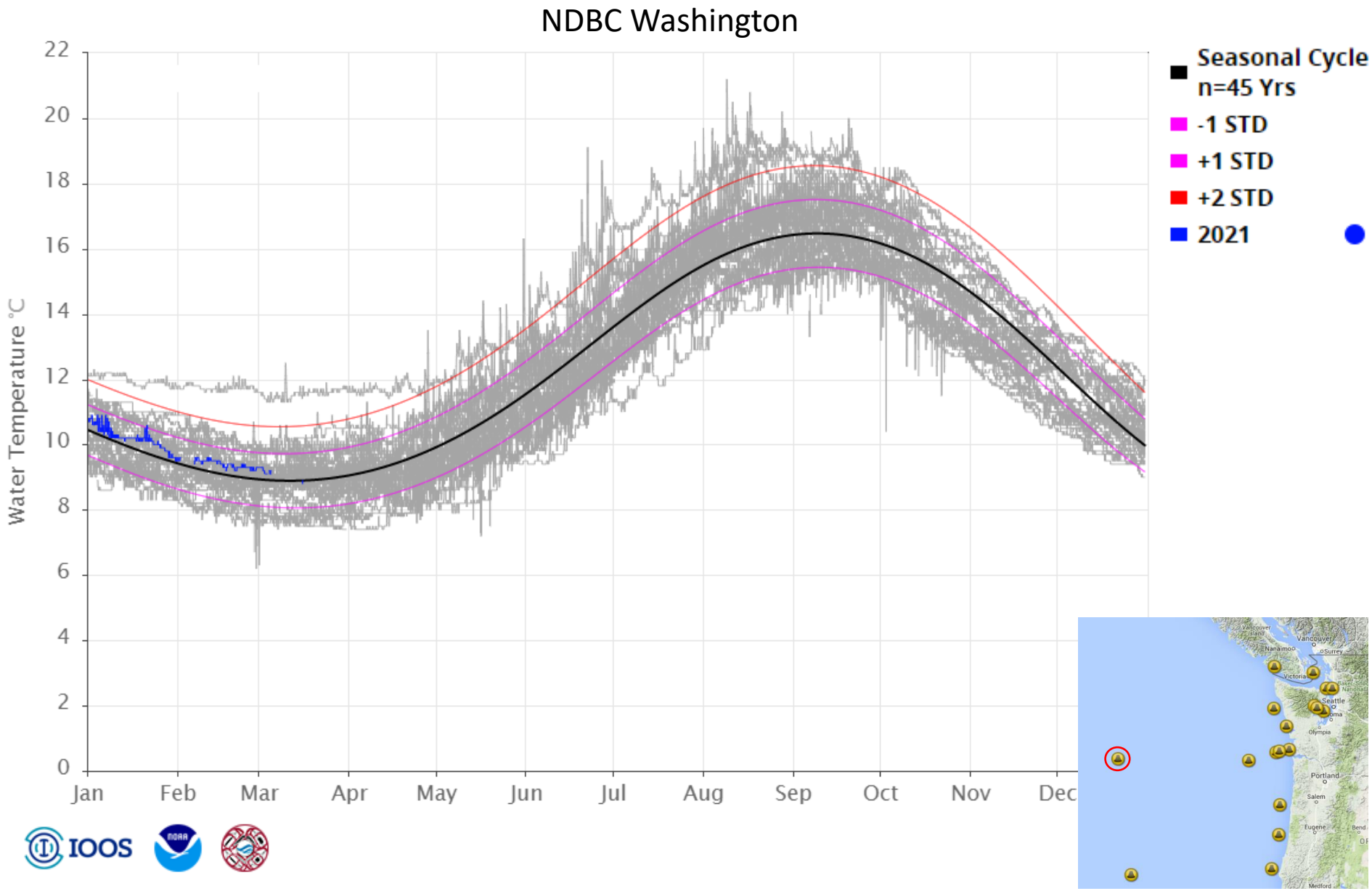


Water Temperature Anomaly



NANOOS: www.nanoos.org Climatology app

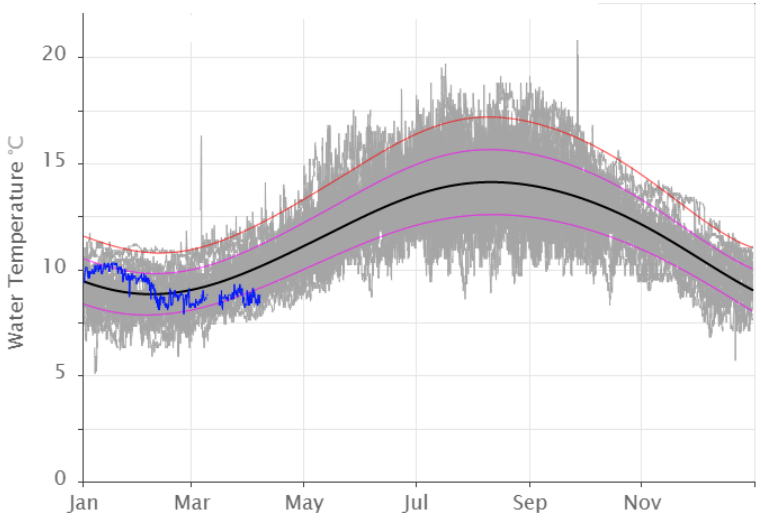
Sea Surface Temperature



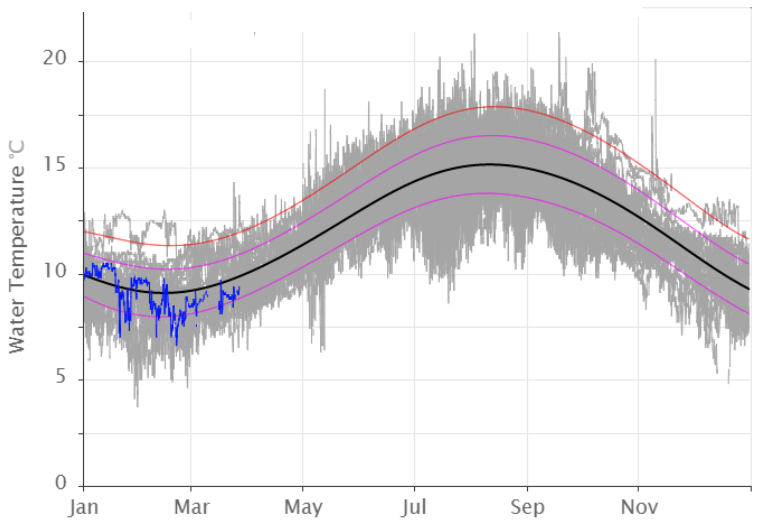
NANOOS: www.nanoos.org Climatology app

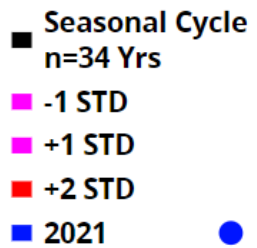
Sea Surface Temperature

NDBC Cape Elizabeth ● 34 yrs

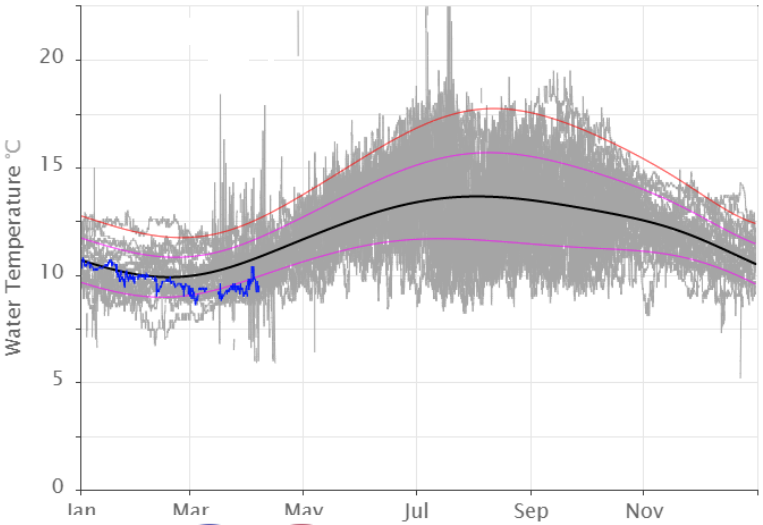


NDBC Columbia River Bar ● 37 yrs

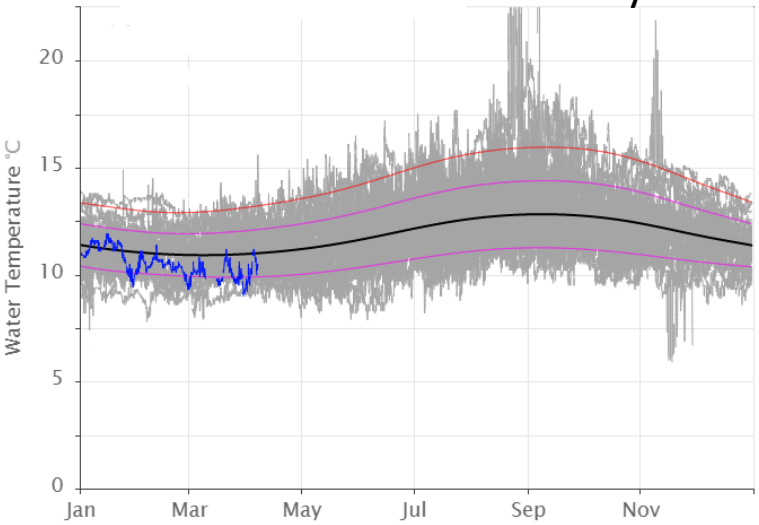


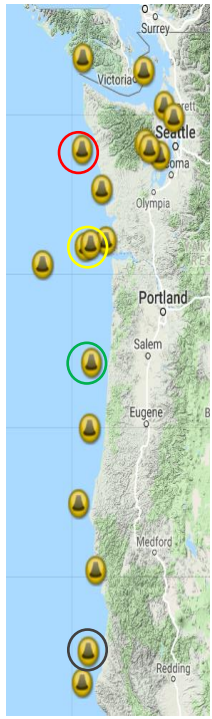


NDBC Stonewall Bank ● 34 yrs



NDBC Eel River ● 39 yrs



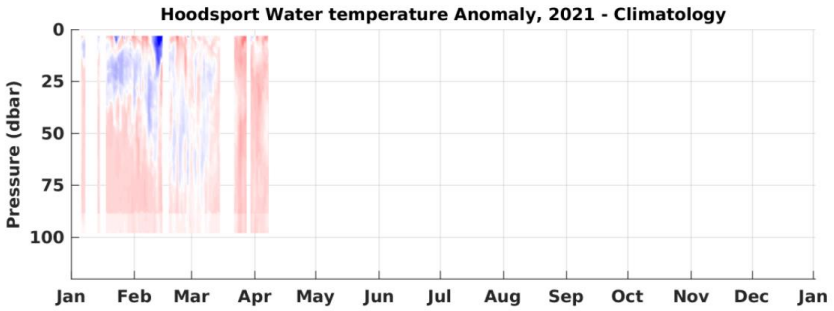


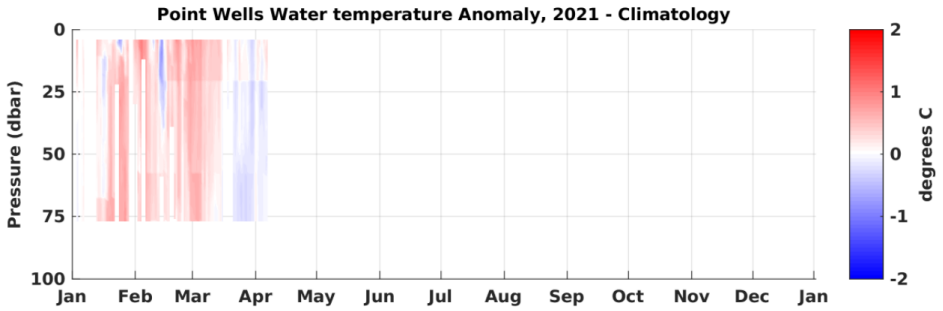
IOOS

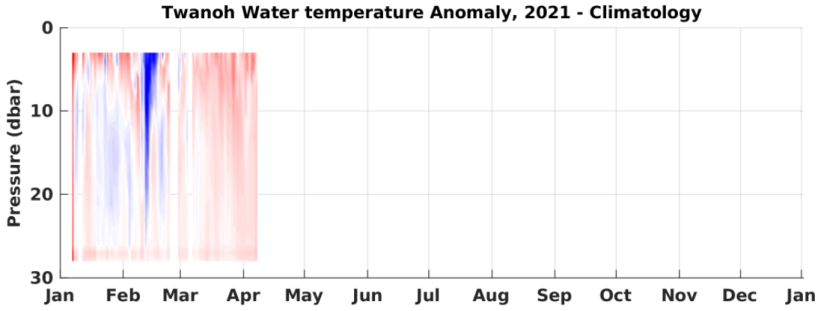
NANOOS: www.nanoos.org Climatology app

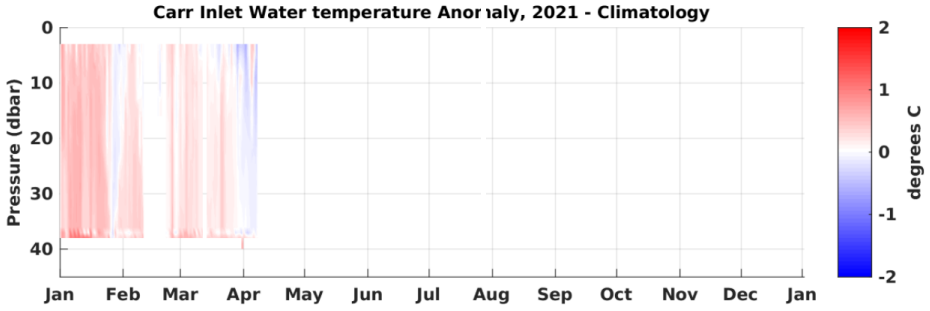
Puget Sound profiling buoys

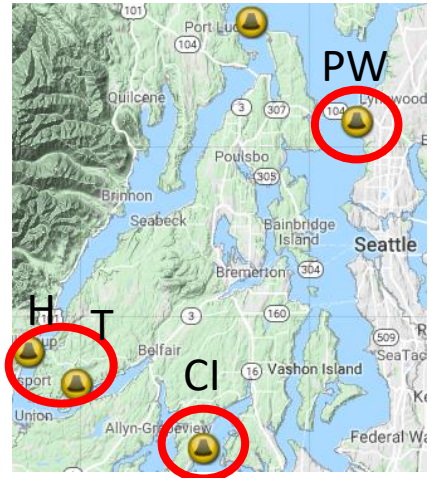
Temperature







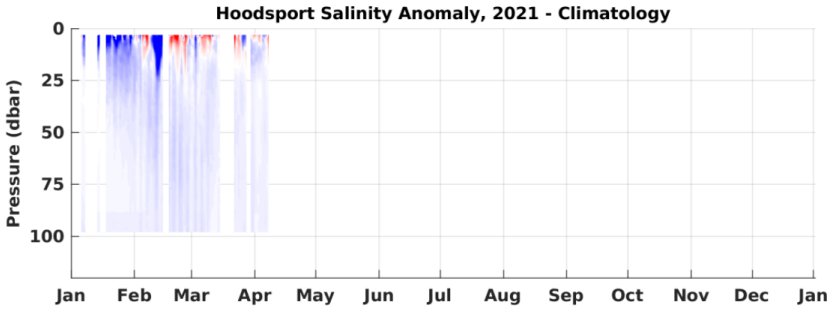


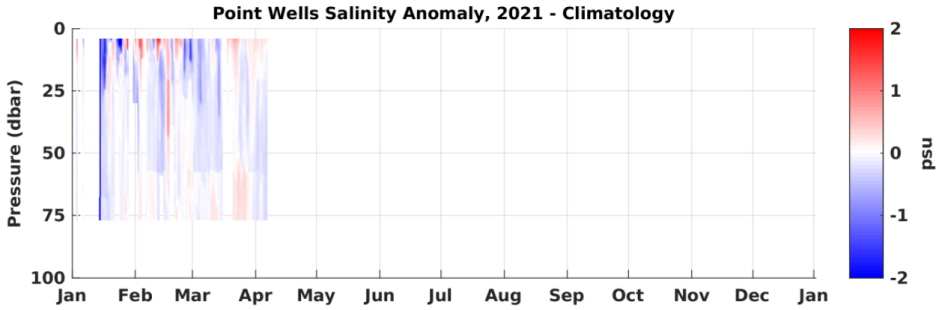


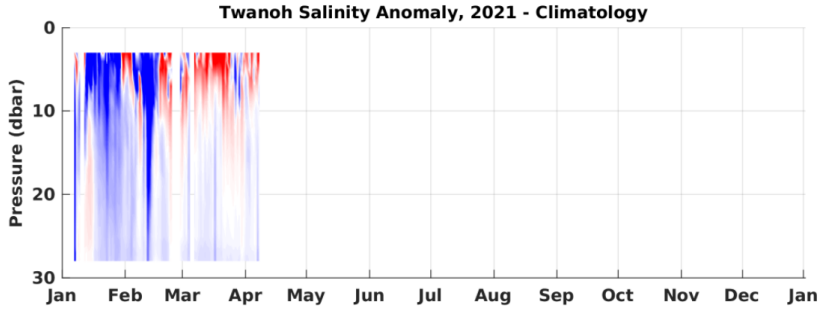
NANOOS: www.nanoos.org Climatology app

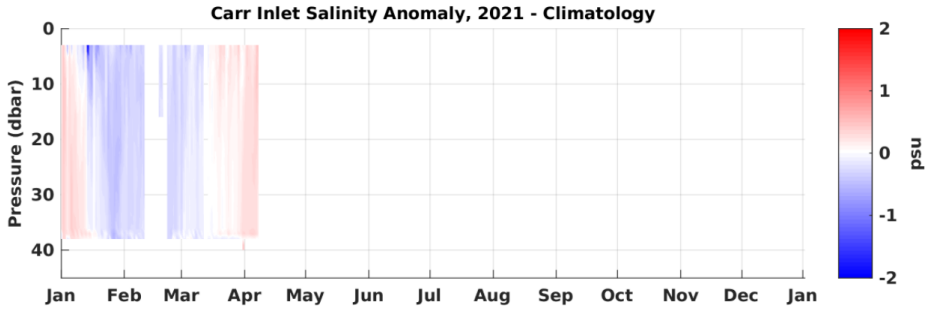
Puget Sound profiling buoys

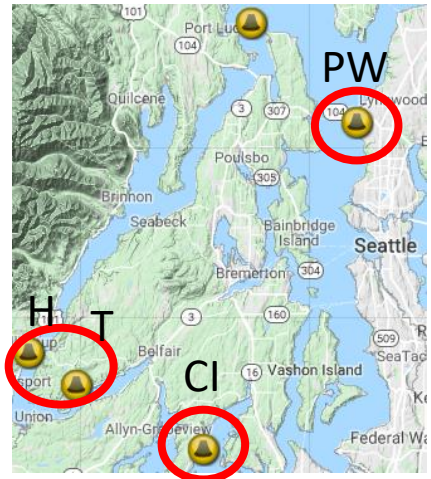
Salinity







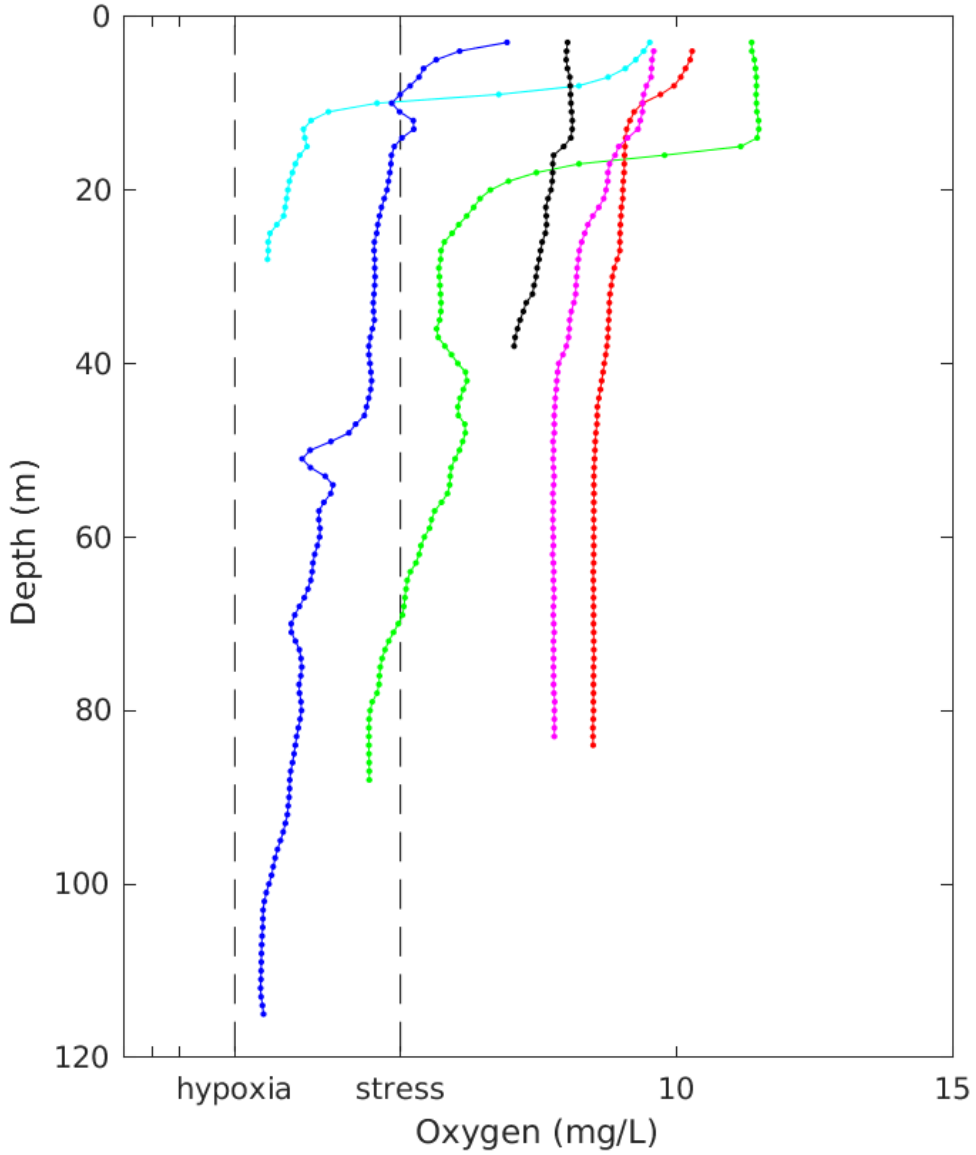




NANOOS: www.nanoos.org Climatology app

Puget Sound profiling buoys

Dissolved Oxygen



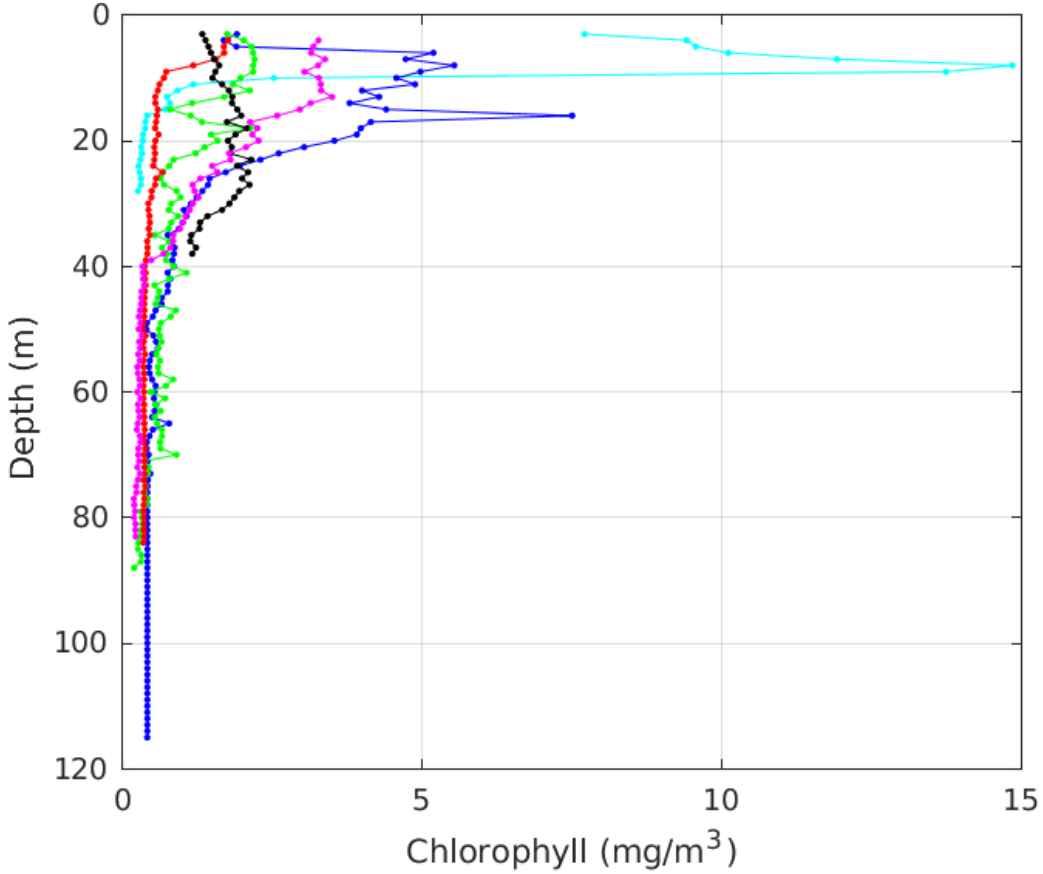
hypoxia (2 mg/L)
biological stress (5 mg/L)
Twanoh (South Hood Canal), 08-Apr-2021 12:15:45
Hoodsport (South Hood Canal), 08-Apr-2021 12:23:01
Dabob Bay (North Hood Canal), 08-Apr-2021 12:20:08
Hansville (near Admiralty Inlet), 08-Apr-2021 12:23:26
Carr Inlet (South Sound), 08-Apr-2021 12:17:03
Point Wells (Main Basin), 07-Apr-2021 12:21:16

IOOS

NANOOS: www.nanoos.org Climatology app

Puget Sound profiling buoys

Chlorophyll



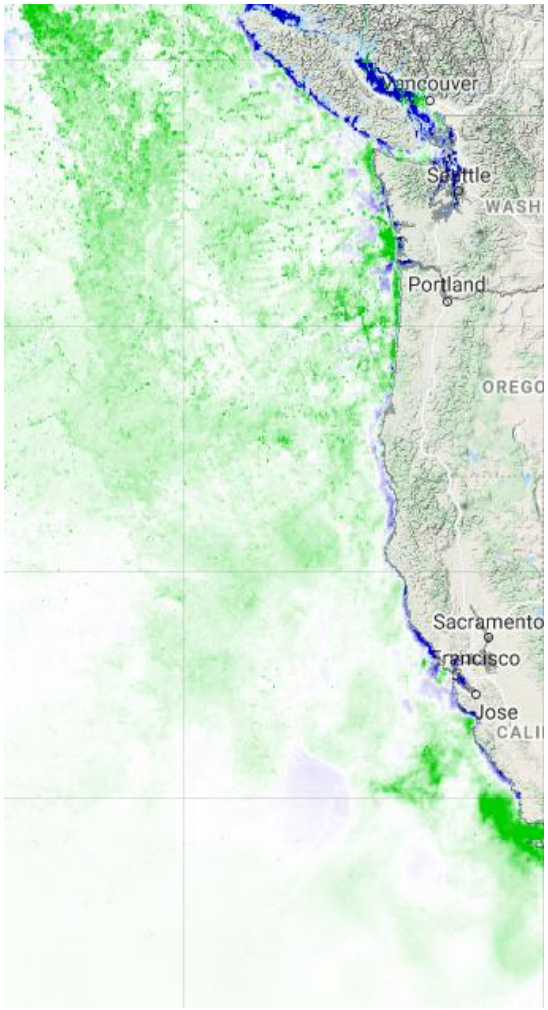
Twanoh, 08-Apr-2021 12:15:45
Hoodsport, 08-Apr-2021 12:23:01
Dabob Bay, 08-Apr-2021 12:20:08
Hansville (North), 08-Apr-2021 12:23:26
Carr Inlet, 08-Apr-2021 12:17:03
Point Wells, 07-Apr-2021 12:21:16

NANOOS: www.nanoos.org Climatology app

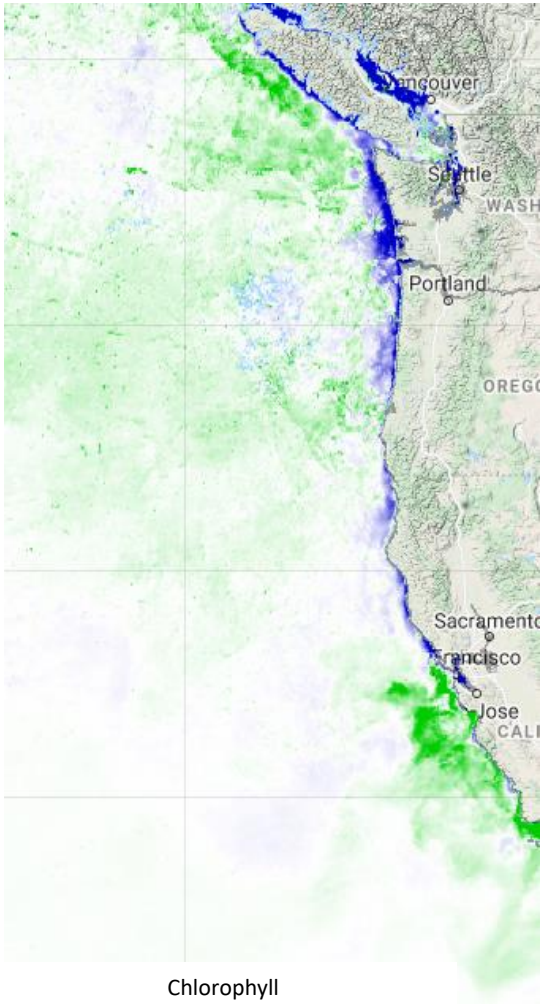
Chlorophyll Anomaly

OSU Modis

January 2021

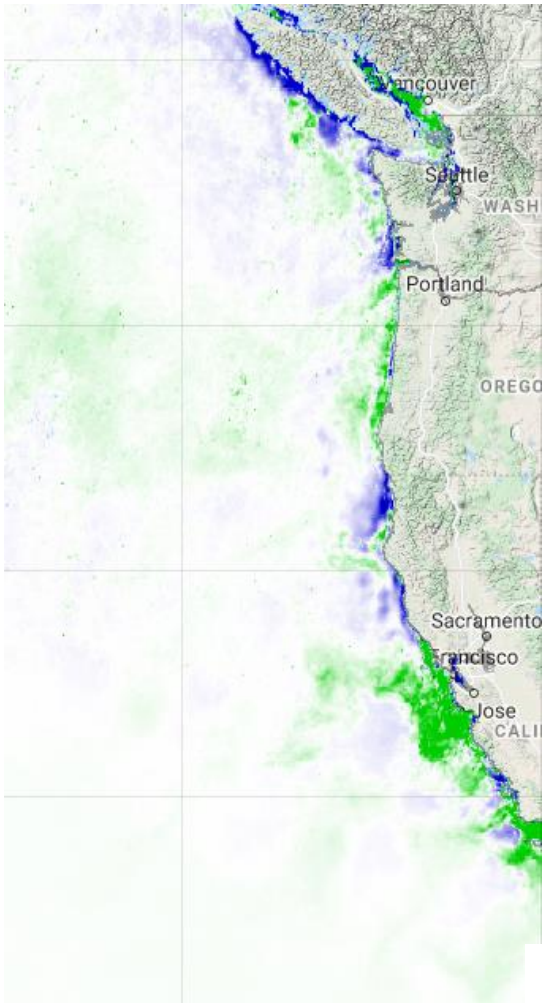


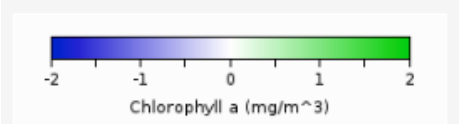
February 2021



Chlorophyll

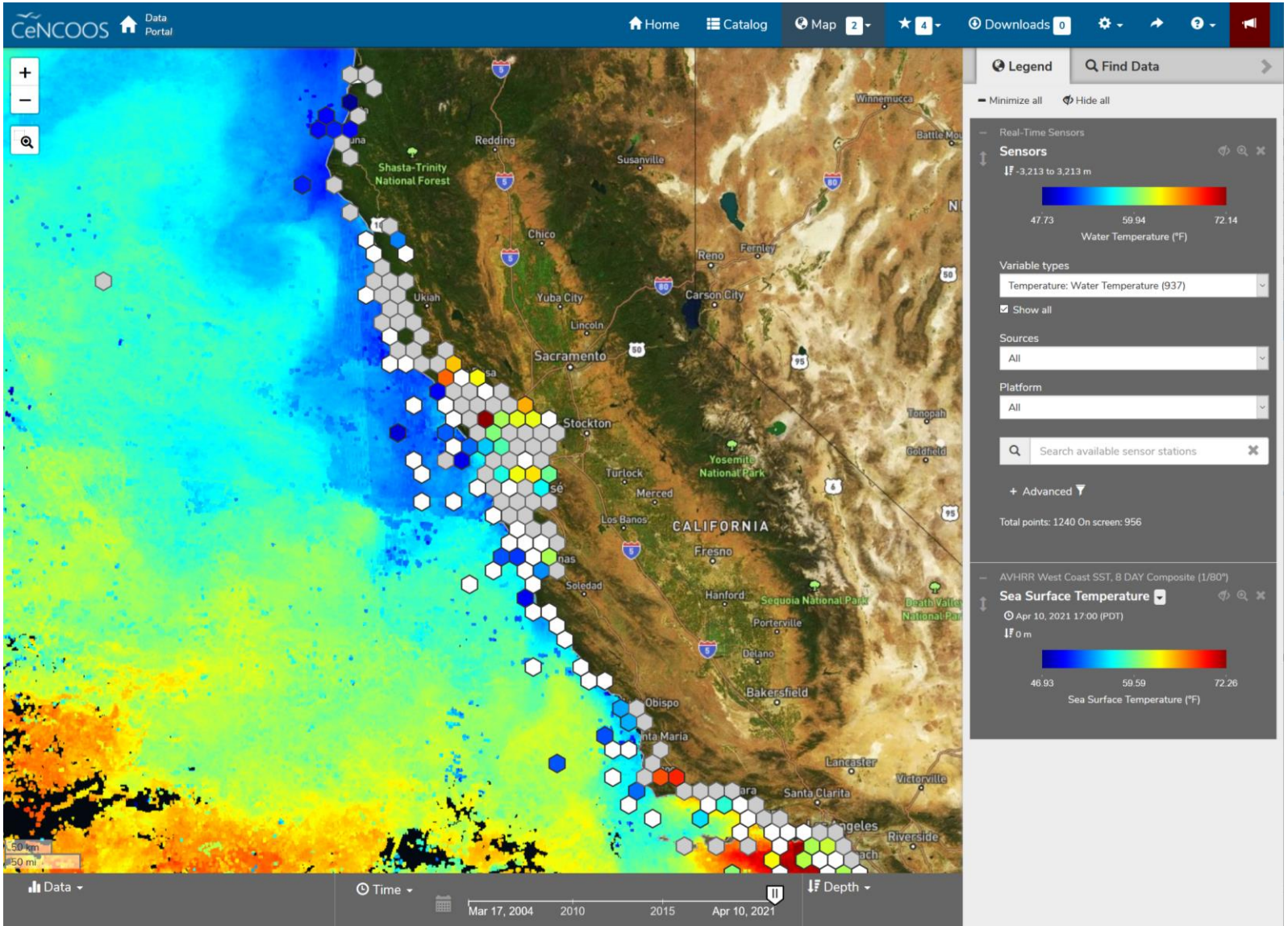
March 2021





CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

NOAA West Watch Update: Apr 2021



CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Temperature: Water Temperature
NOAA National Data Buoy Center (NDBC)
46022 - EEL RIVER - 17NM WSW of Eureka, CA

Chart Time series | Autoscale | Time bin : days Auto

Eel River

Temperature: Water Temperature
NOAA National Data Buoy Center (NDBC)
Monterey - 27 NM WNW of Monterey, CA (46042)

Chart Time series | Autoscale | Time bin : days Auto

Monterey

Temperature: Water Temperature
NOAA National Data Buoy Center (NDBC)
Santa Maria - 21 NM NW of Point Arguello, CA (46011)

Chart Time series | Autoscale | Time bin : days Auto

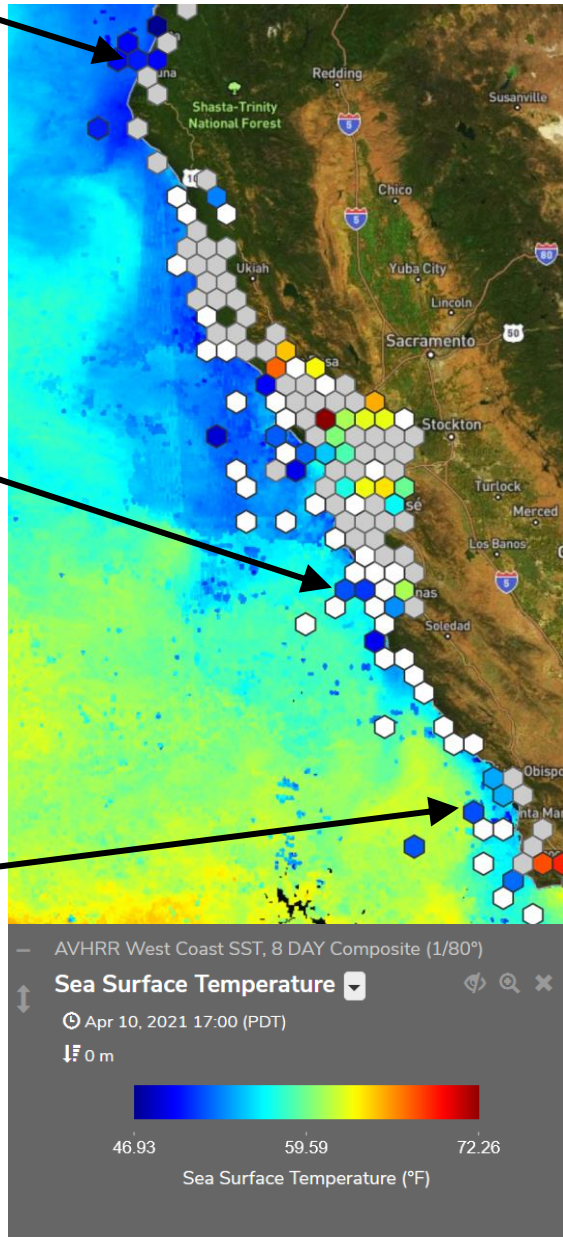
Santa Maria

Observations | Min/max envelope | Mean

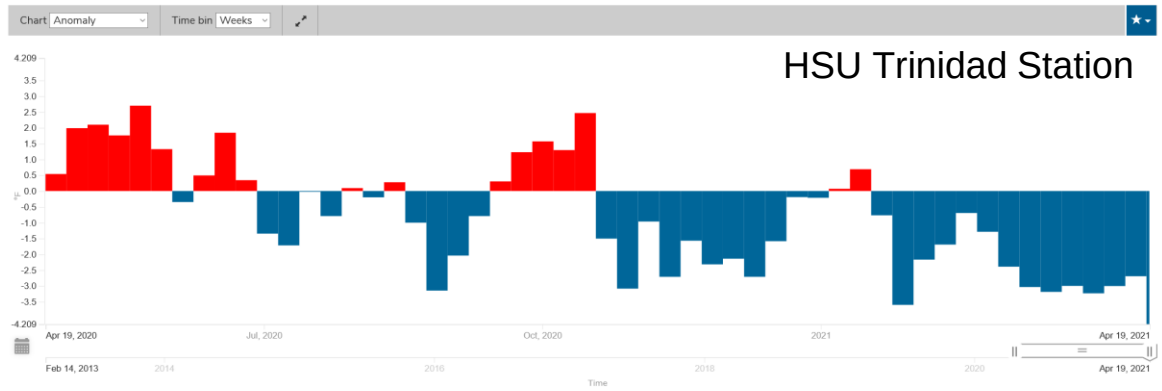
Seasonal statistics | Mean to 90th percentile | Mean to 10th percentile | Mean | High | Low

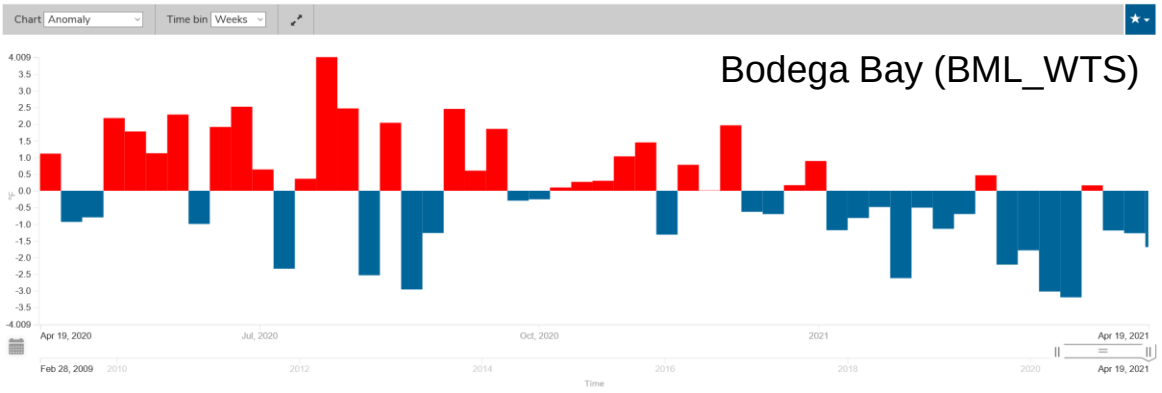
https://data.cencoos.org

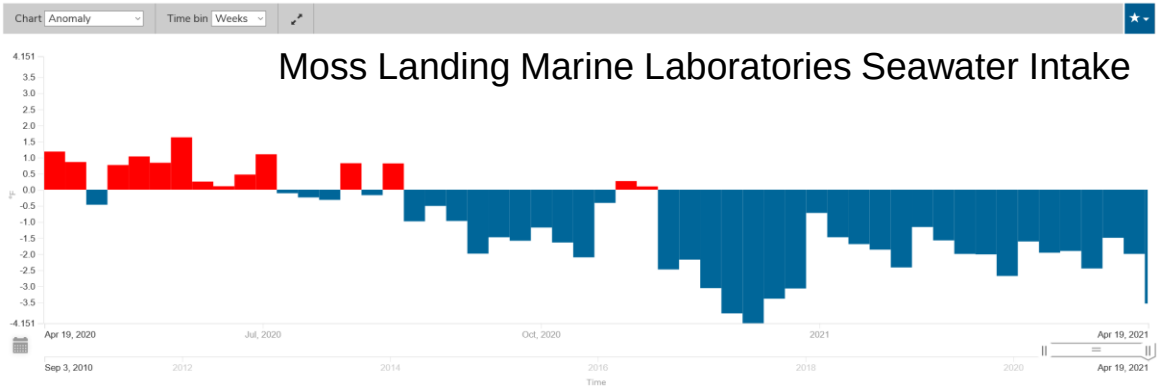
Sea Surface Temperature

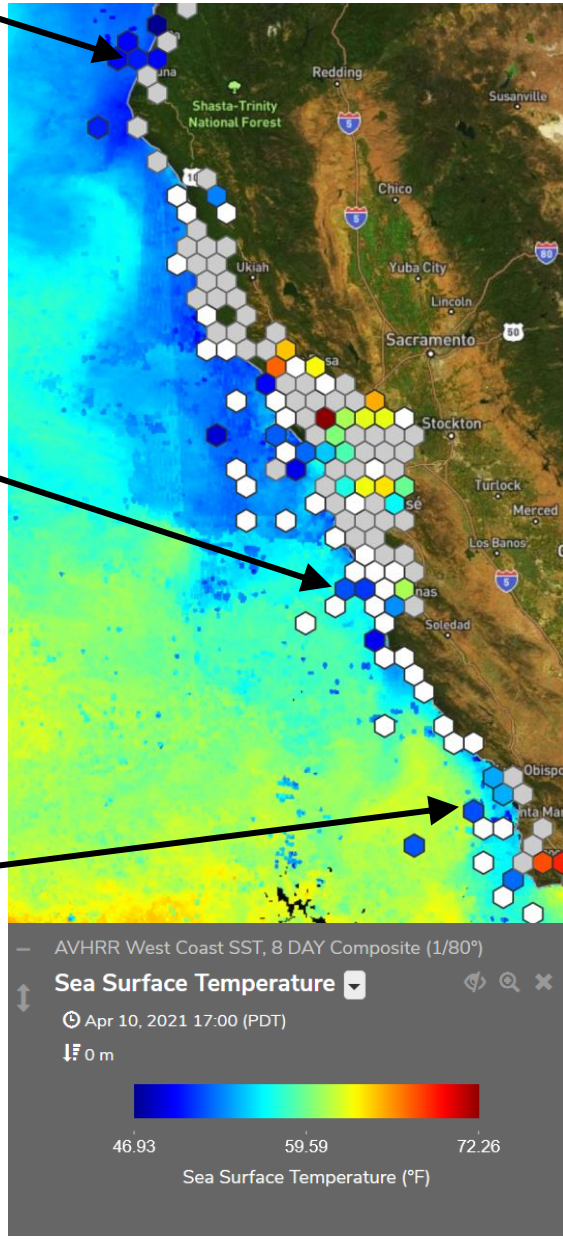


Temp Anomaly: Shore Sta.









CeNCOOS Data Portal

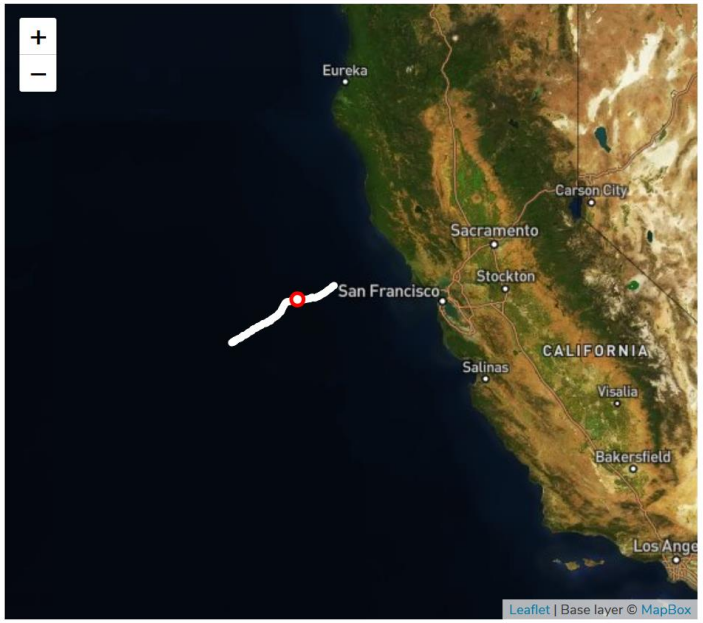
Home | Catalog | Map 1 | Data views 4 | Downloads 0 | Settings | Share | Help | Feedback

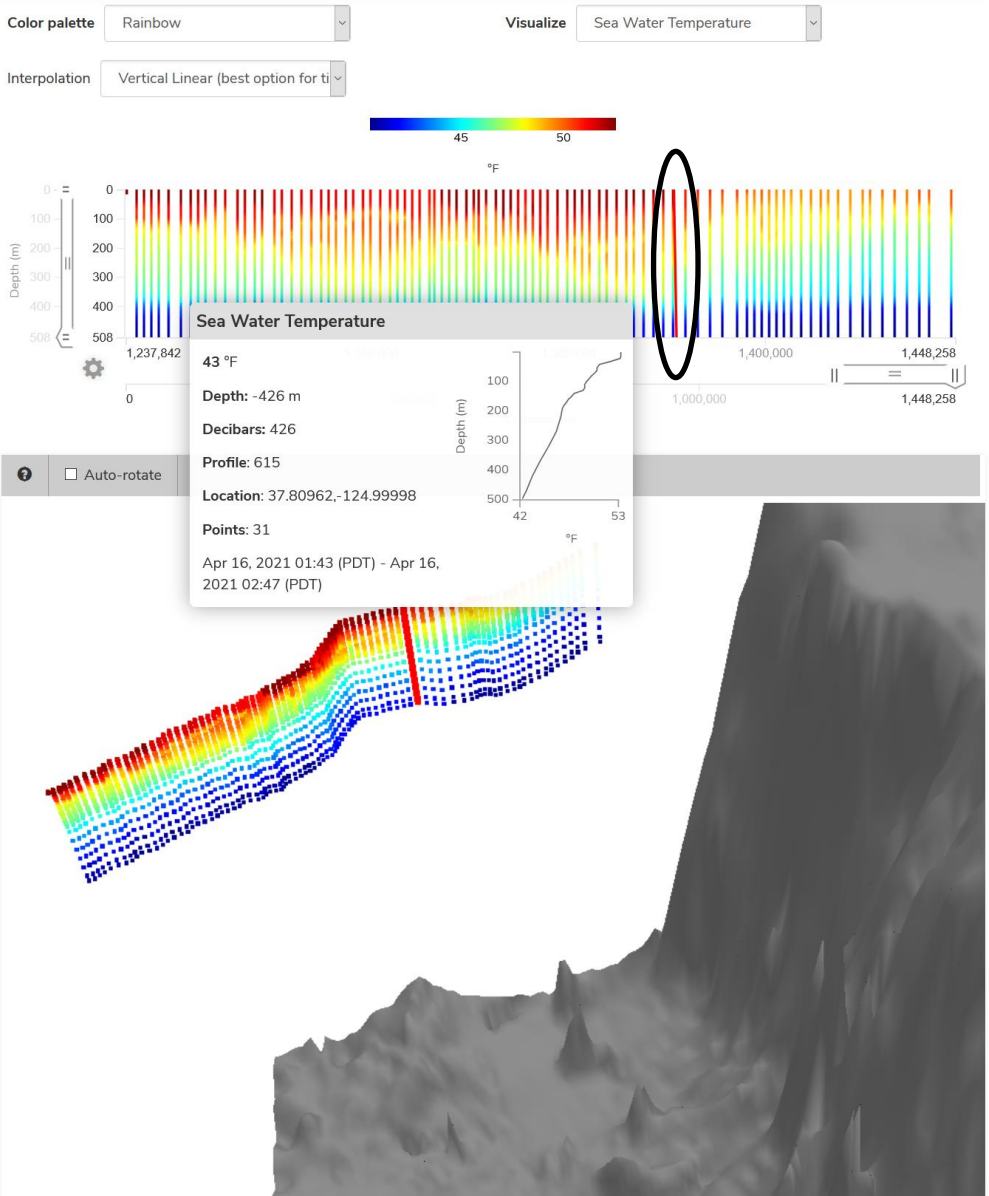
All 1,733 | Sensor Stations 1,240 | Data Layers 302 | Platforms 58 | Variable Types 87 | Affiliates 46

sp028-20210218T2317 (platform)

Downloads

Done



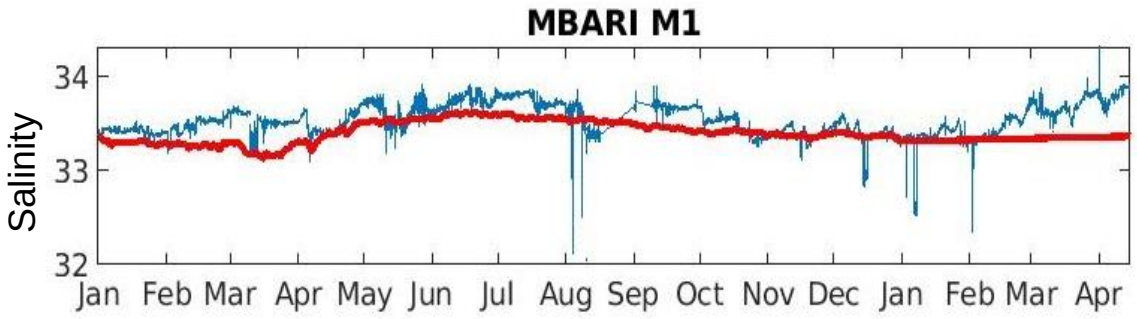


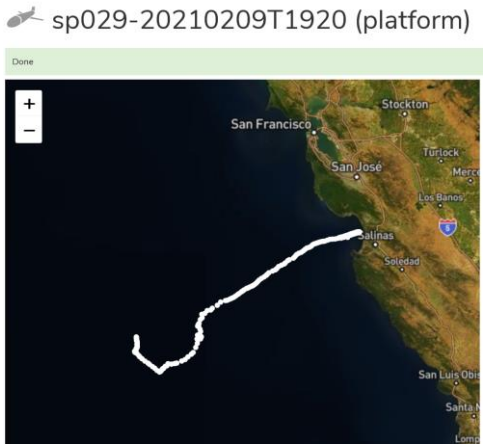
sp028-20210218T2317

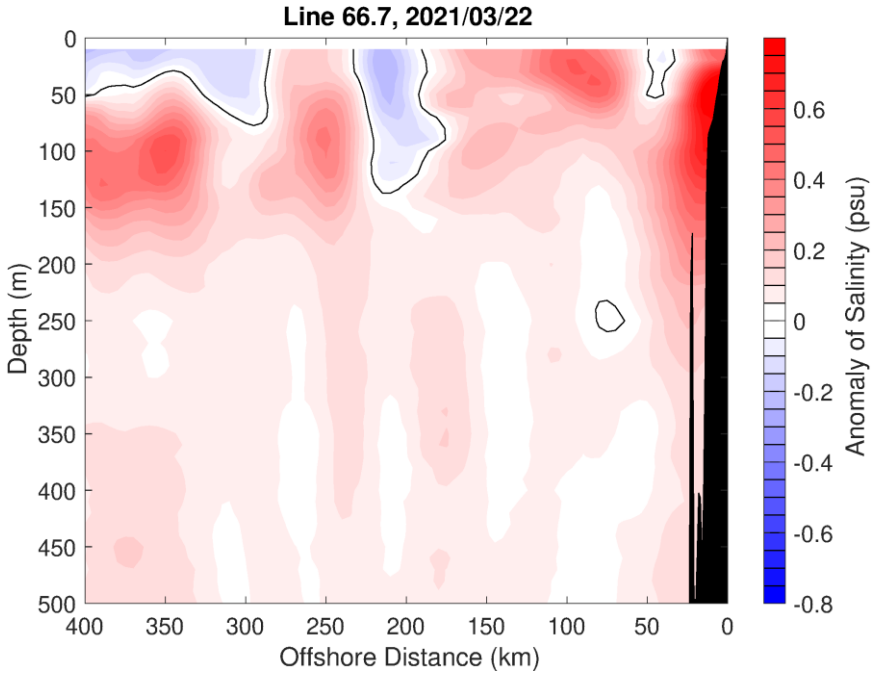
Date range	Feb 18, 2021 19:36 (PST) - Apr 19, 2021 03:10 (PDT)
Metadata	https://data.ioos.us/gliders/erddap/info/sp028-20210218T2317/index.html
Animal ID	None
Depth range	0.11910519748926163 (m) - 511.9259033203125 (m)
Points	69,920
Institution	Scripps Institution of Oceanography
Authority	edu.ucsd.scripps

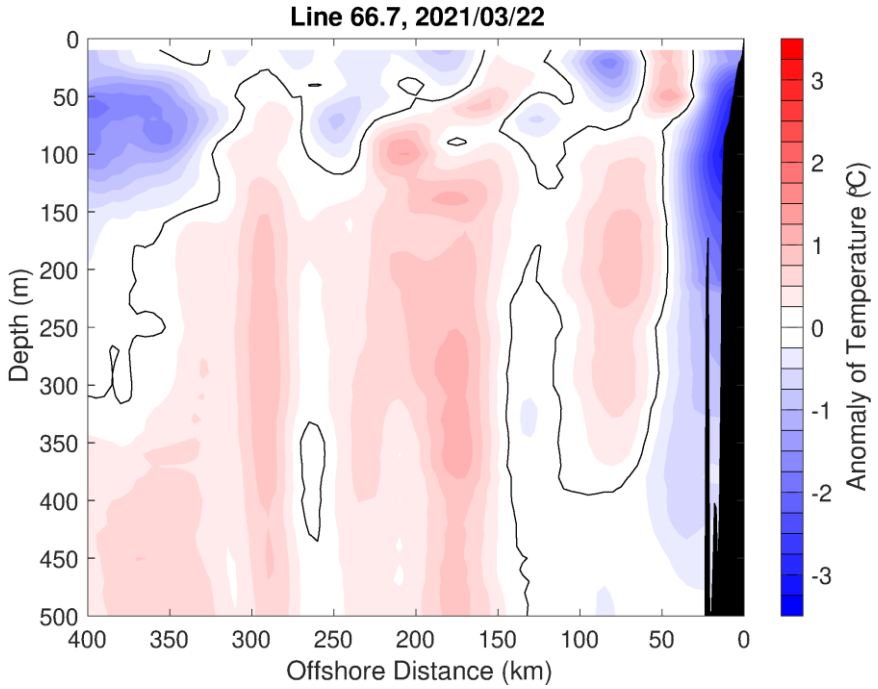
https://data.cencoos.org

M1 and Line 67





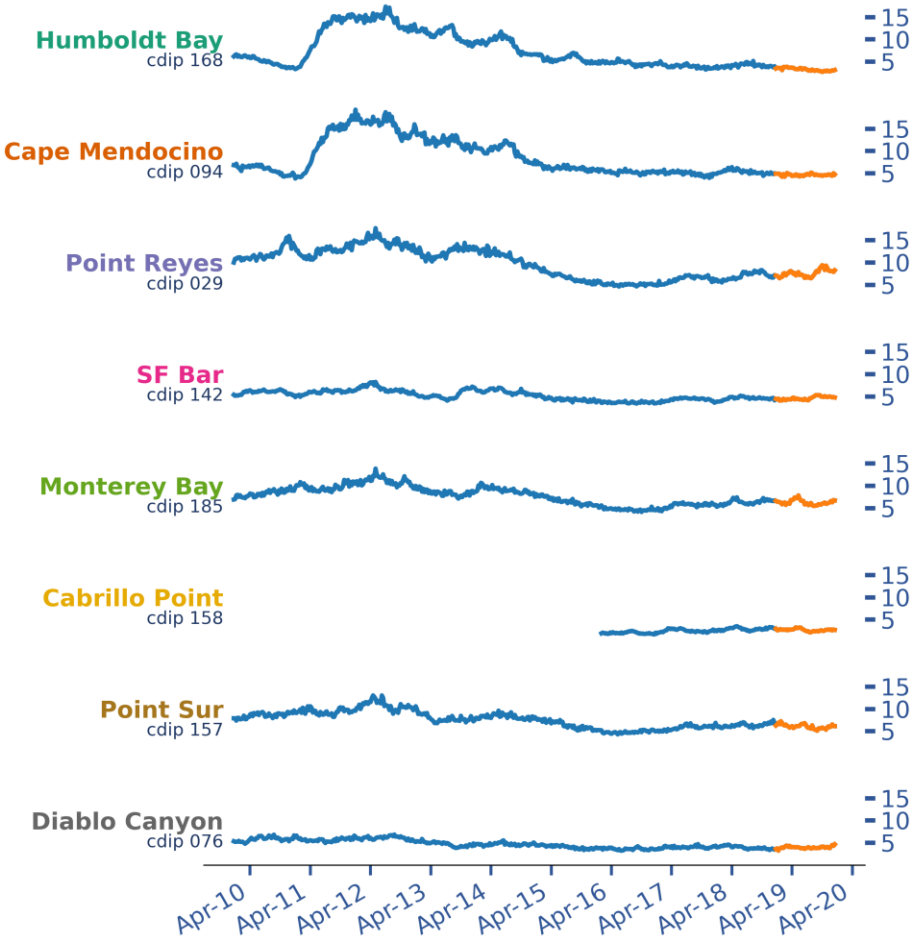


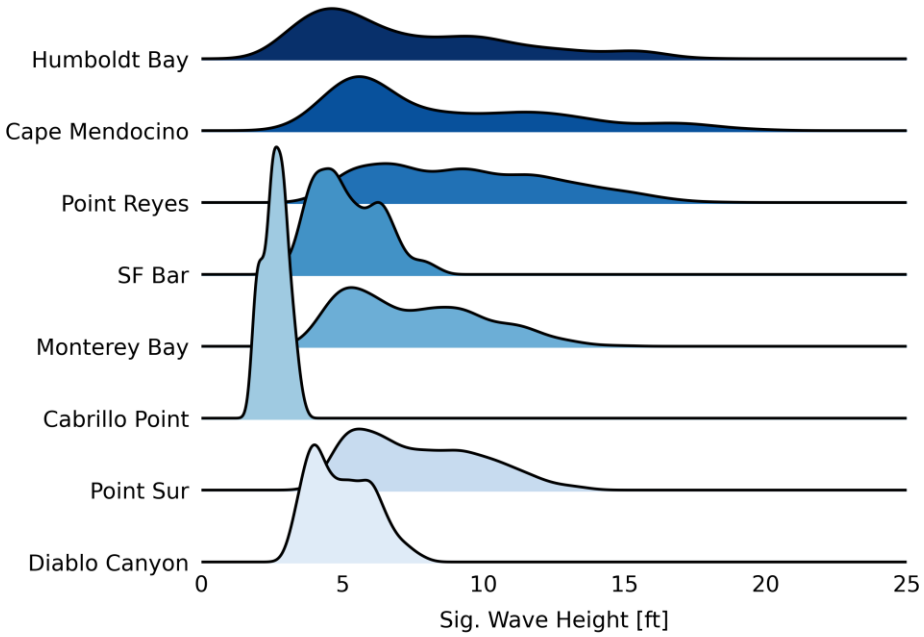


https://spraydata.ucsd.edu/climCUGN/

CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Wave Tracker



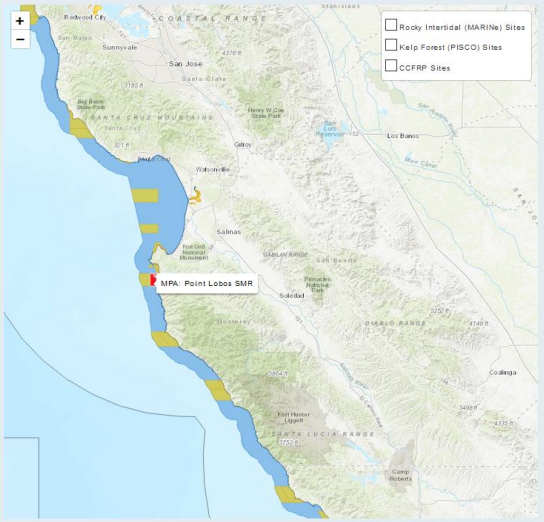


https://www.cencoos.org/information-solutions/recent-waves/

Time Series

Select an MPA from menu or map:

Point Lobos SMR



Select one or more variables:

Significant Wave Height, Monthly Maximum
Significant Wave Height, Monthly Mean
Total Catch Per Unit Effort, Fishery-Independent Angler Surveys
Total Fish Counts, Fishery-Independent Angler Surveys
Wave Orbital Velocity, Annual 95th Percentile

Extratropical-Based Northern Oscillation Index, Monthly
Biologically Effective Upwelling Transport Index (BEUTI)
Net Primary Productivity, Monthly Mean
Kelp Canopy Area Cover
Total Kelp Forest Fish Counts, Diver Surveys

Select date range:

1970 — 2000 — 2020

Select plot statistics:

- [x] Bioregion combined MPAs, mean
- [ ] Bioregion combined MPAs, range
- [ ] Bioregion, mean
- [ ] Bioregion, range

Plot Time Series

Correlation Plots

View and Download Data Tables

Prototype - California MPA Dashboard

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

OCEAN PROTECTION COUNCIL

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

IOOS Integrated Ocean Observing System

Sea Grant California

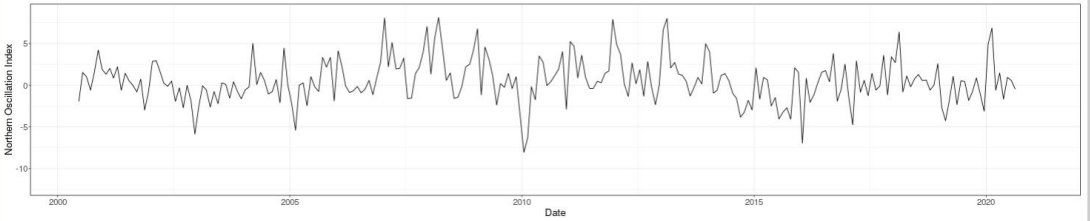
Point Lobos SMR

Central Coast Bioregion

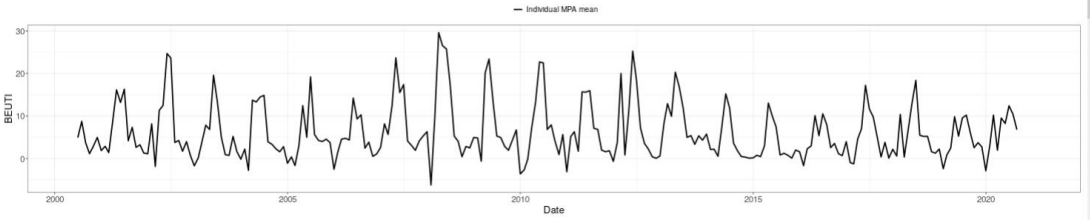
Year Established: 1973/2007
MPA Type: State Marine Reserve
No-Take: Yes

Monitoring data from:
Rocky Shores (MARINe)
Kelp Forests (PISCO)
California Collaborative Fisheries Research Program (CCFRP)

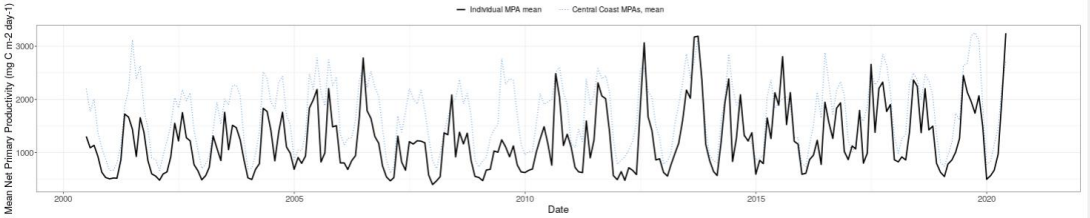
Extratropical-Based Northern Oscillation Index, Monthly
NOAA Environmental Research Division



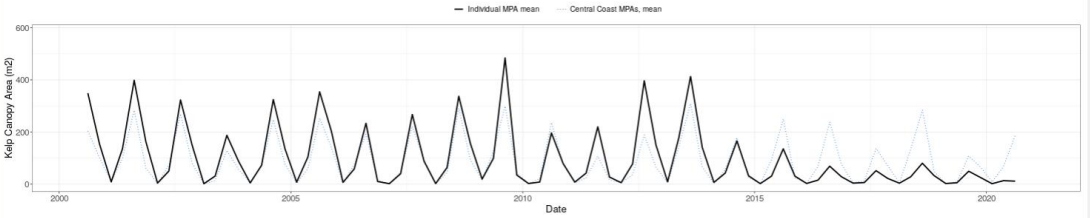
Biologically Effective Upwelling Transport Index (BEUTI)
NOAA Environmental Research Division



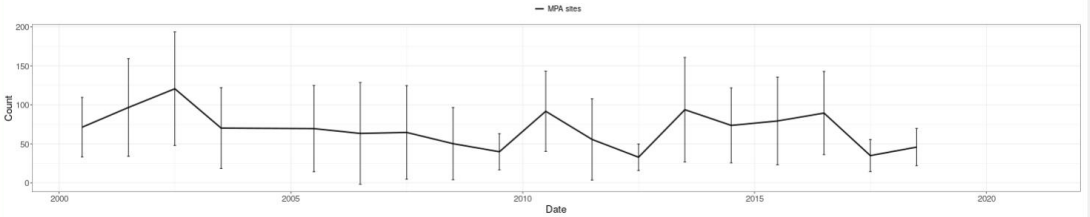
Net Primary Productivity, Monthly Mean
California Current Merged Satellite-Derived 1-km Dataset



Kelp Canopy Area Cover
Santa Barbara Coastal LTER



Total Kelp Forest Fish Counts, Diver Surveys
Partnership for Interdisciplinary Study of Coastal Oceans (PISCO)



CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Thank you

hruhl@mbari.org

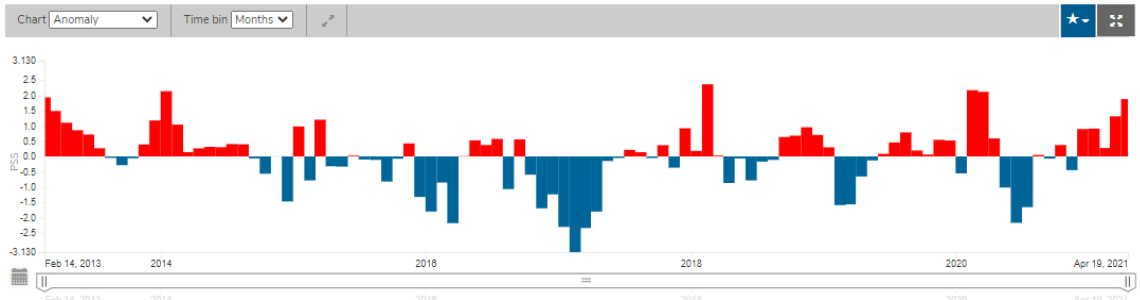
NOAA West Watch Update

Apr 2021

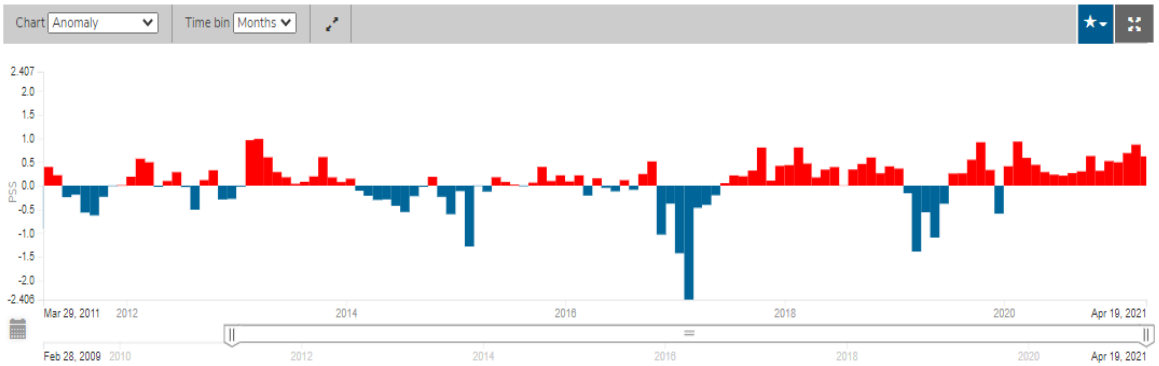
CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Salinity Anomaly: Shore Sta.

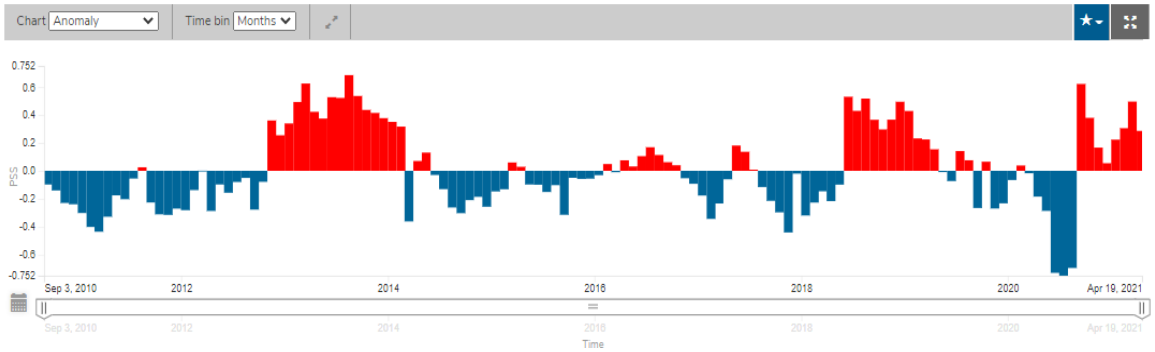
46022 - EEL RIVER - 17NM WSW of Eureka, CA

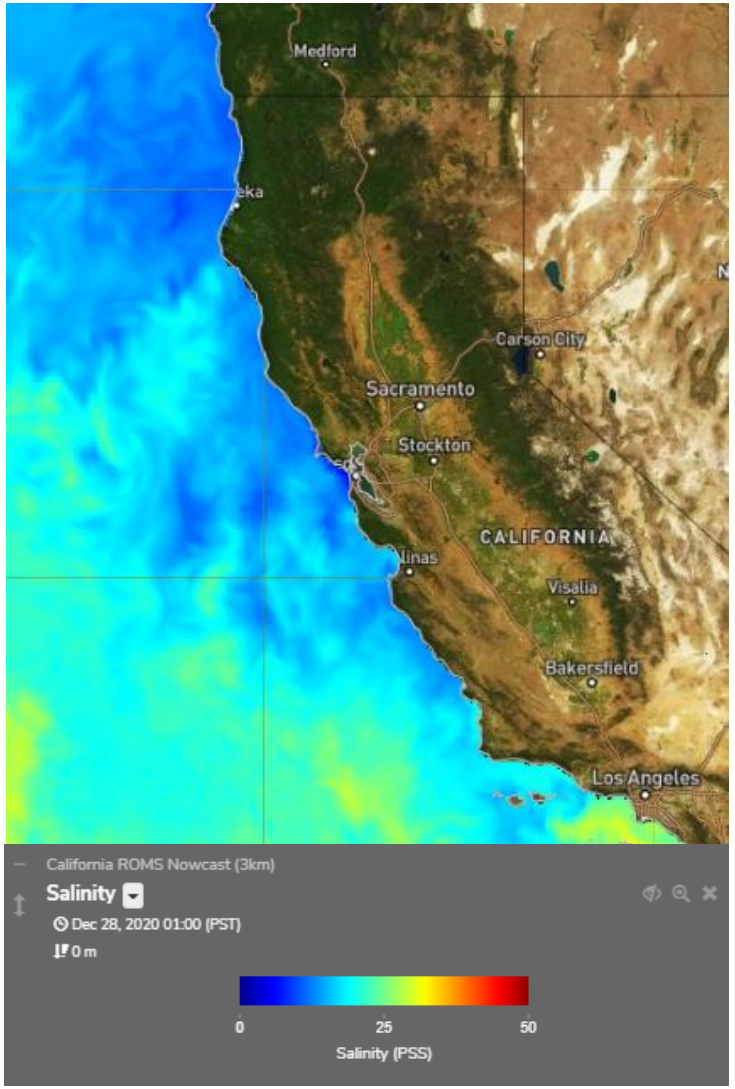


Bodega Bay (BML_WTS)

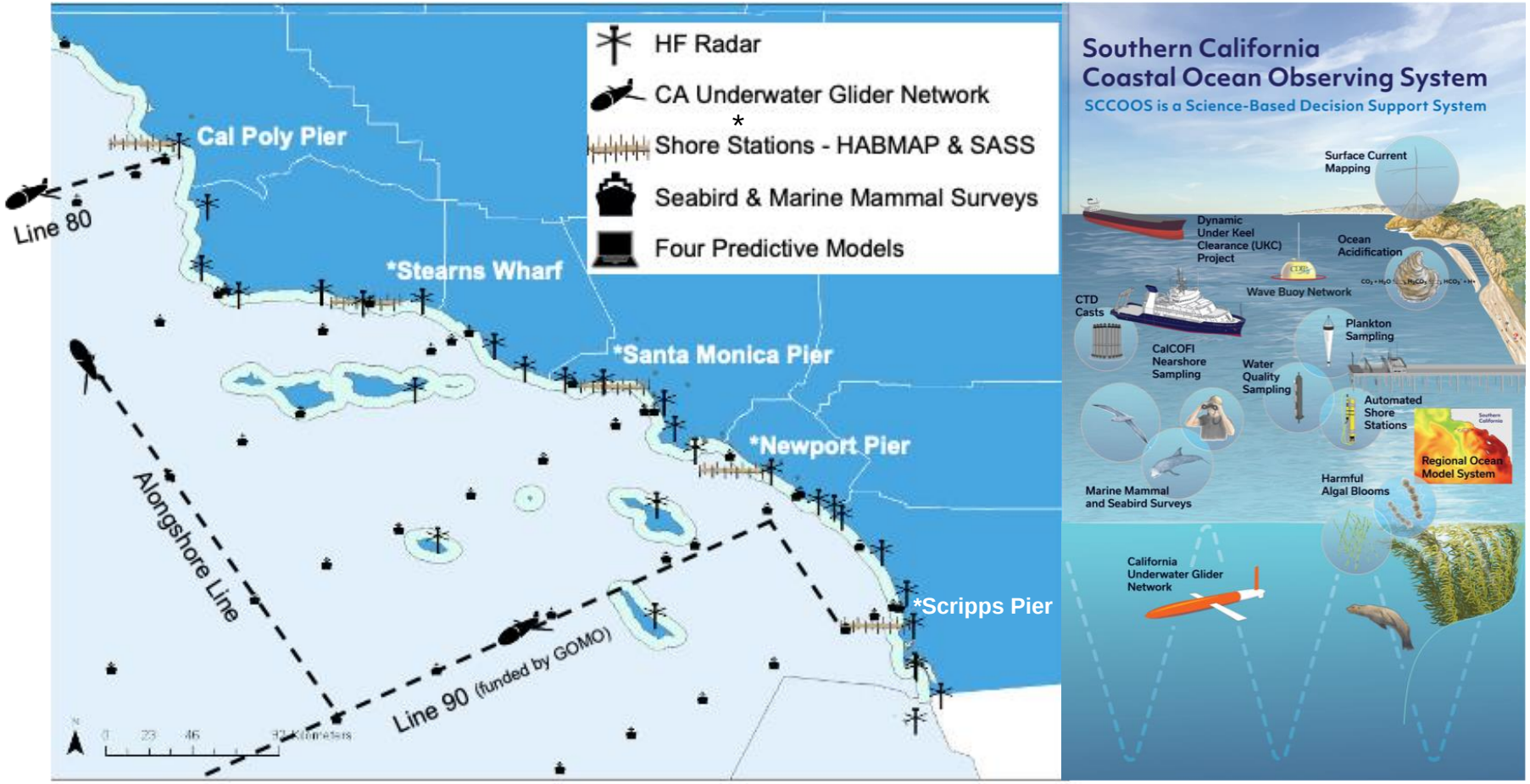


Moss Landing Marine Laboratories Seawater Intake





SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM



NOAA West Watch Webinar: Southern California

Dr. Clarissa Anderson, SCCOOS Executive Director

20-April 2021

IOOS Integrated Ocean Observing System

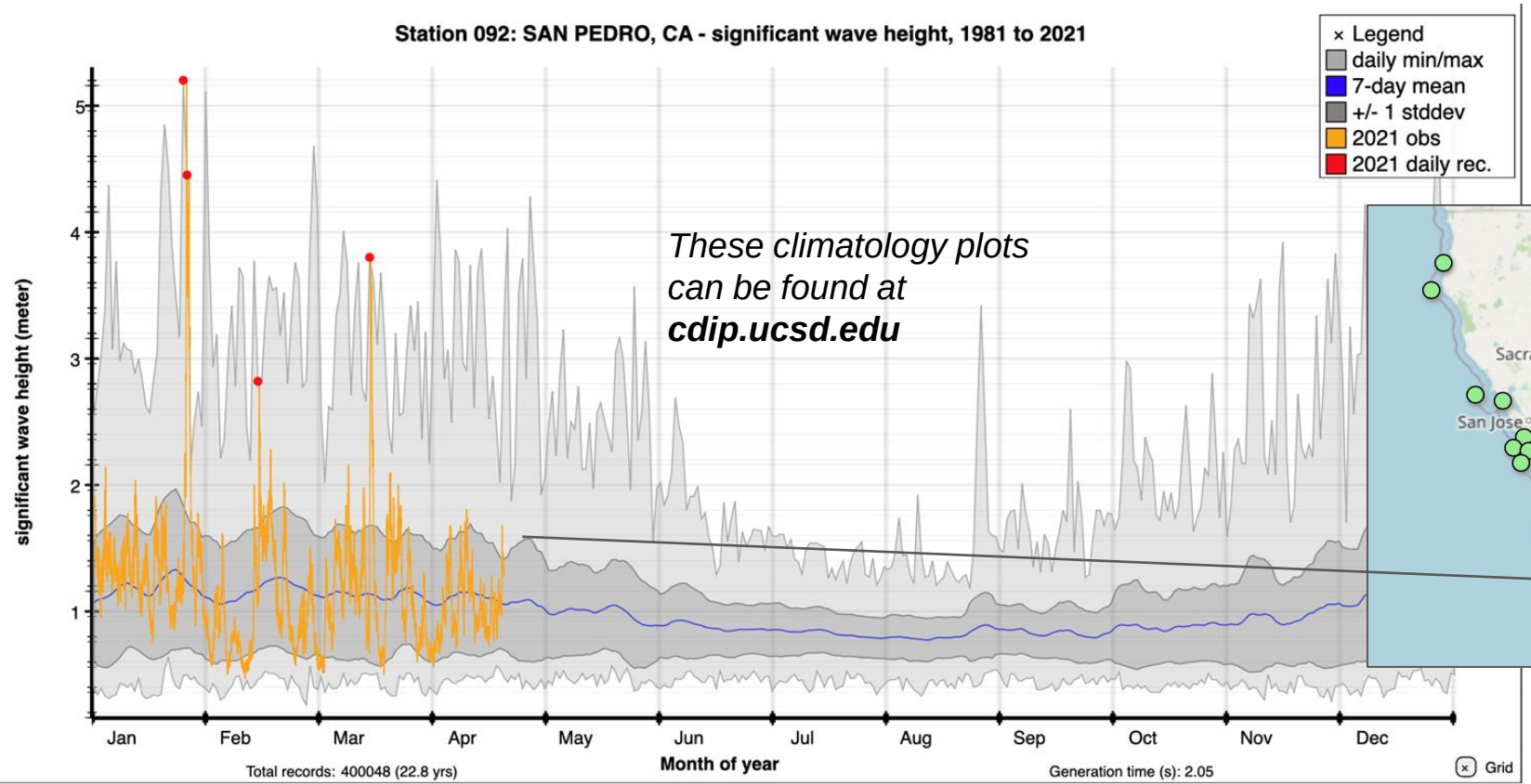
Coastal Data Information Program (CDIP)

California wave activity in 2021 has been following the long term climate trend.

Significant wave height (Hs) record set at CDIP 092 San Pedro

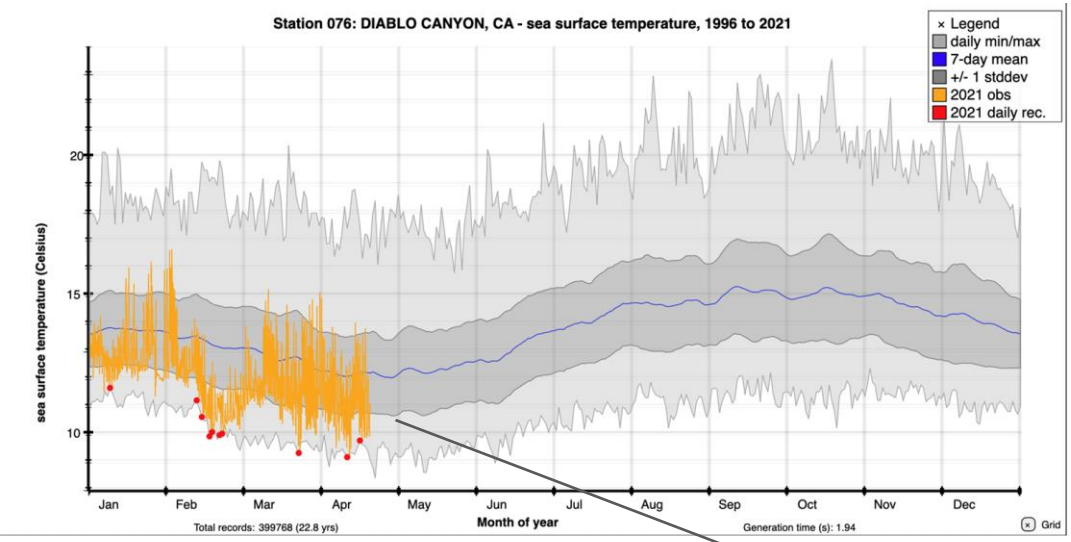
Hs = 5.20 m on 25-Jan-2021 (Tp = 9 sec; waves generated by local winds)

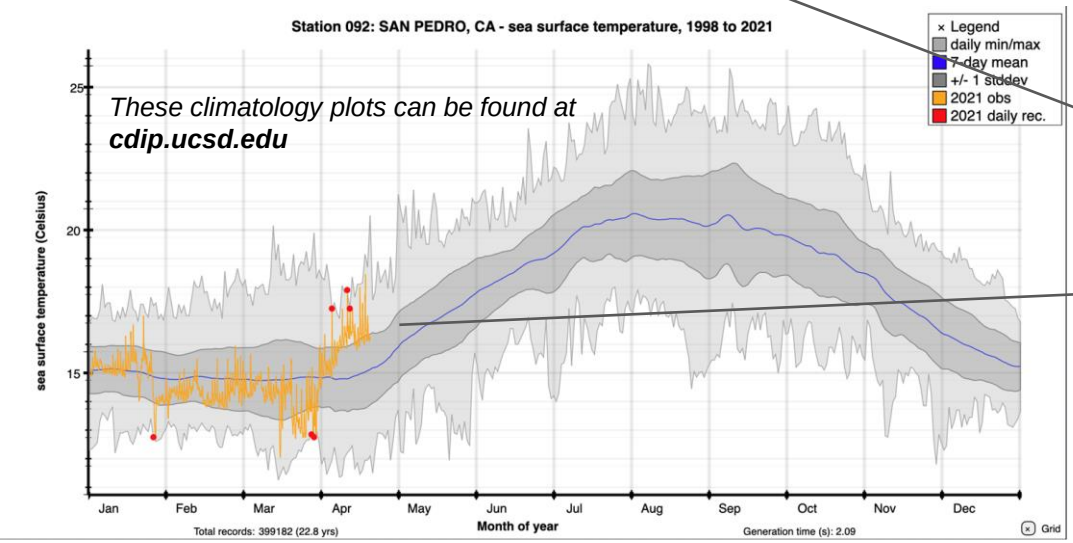
All time maximum (since 1998)



Behrens, SIO

Coastal Data Information Program (CDIP)

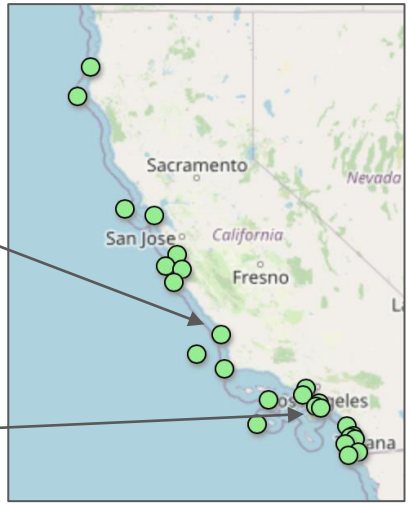




California Sea Surface Temp

Coastal waters were measuring below the climate trend at all buoys.

South of Pt Conception, a transition to warmer conditions in April.



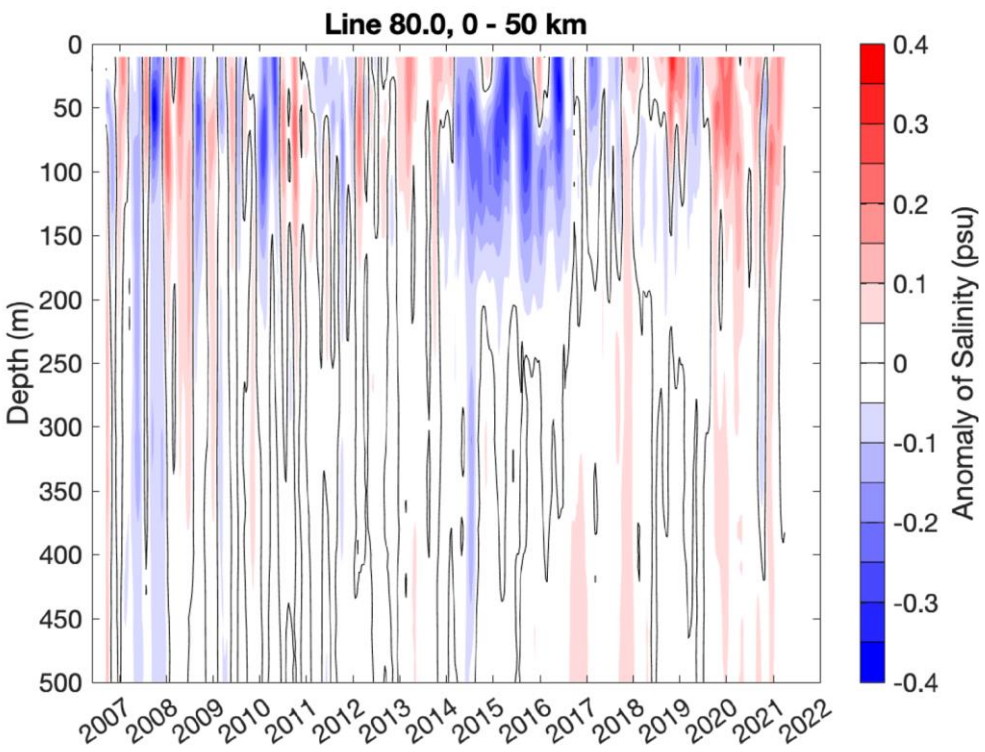
QC Note

CDIP 100 Torrey Pines *SST was recently discovered to be ~1 C low.*

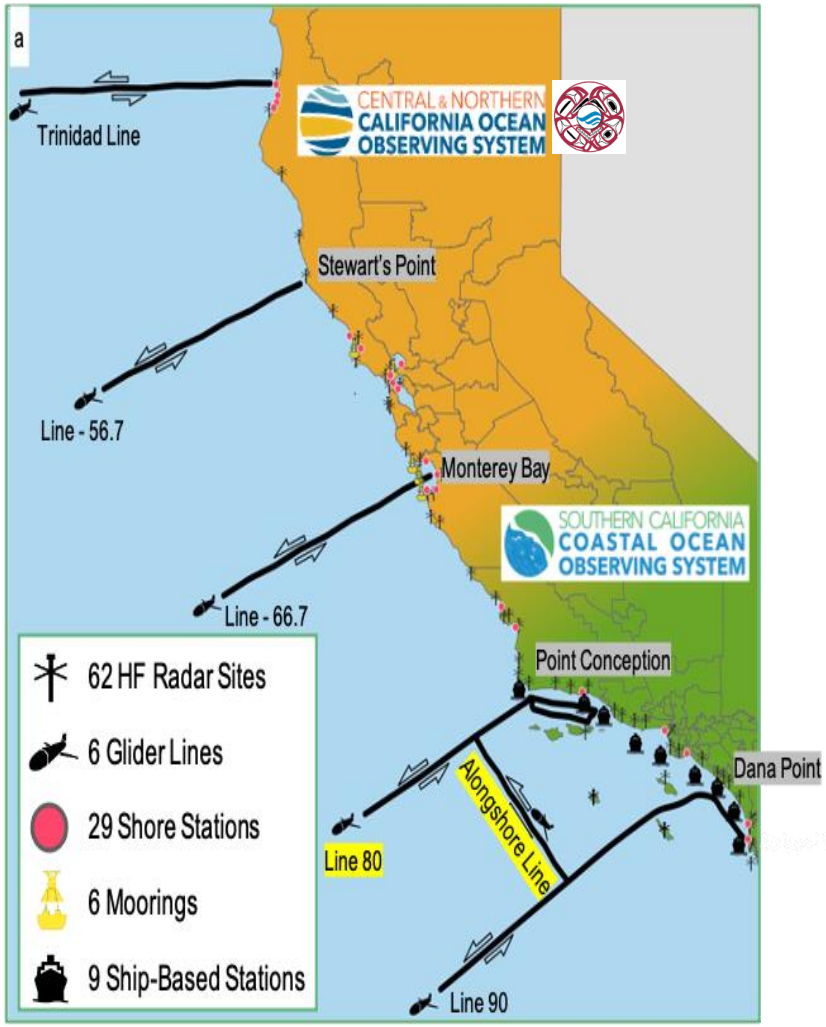
- Buoy swapped
- Data flagged
- QA improvements (0.2°C tolerance)

Behrens, SIO

California Underwater Glider Network



Salinity Anomaly

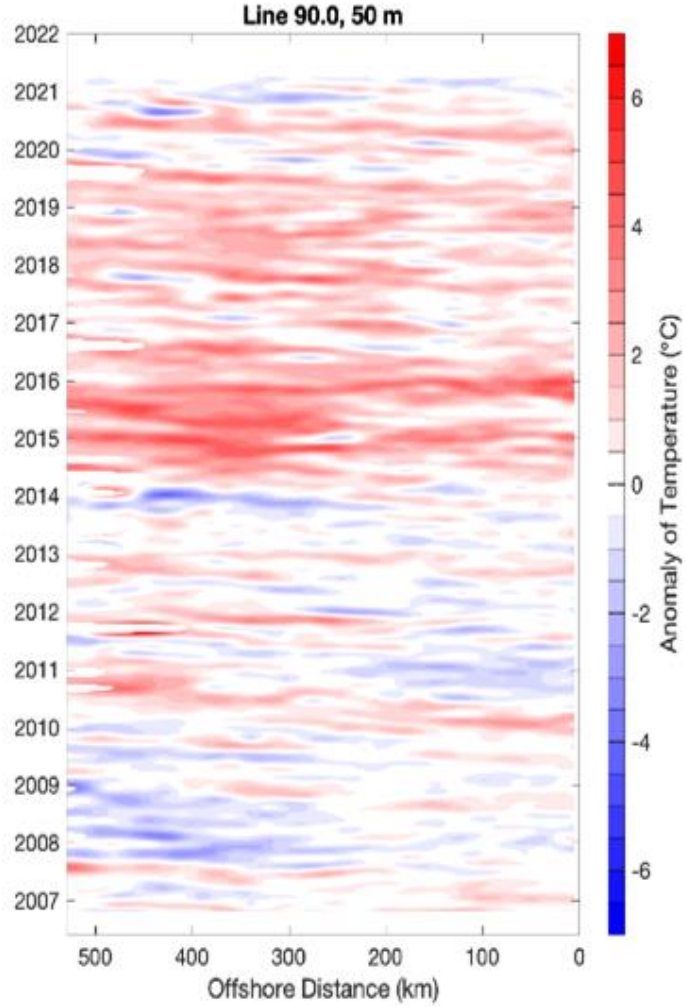


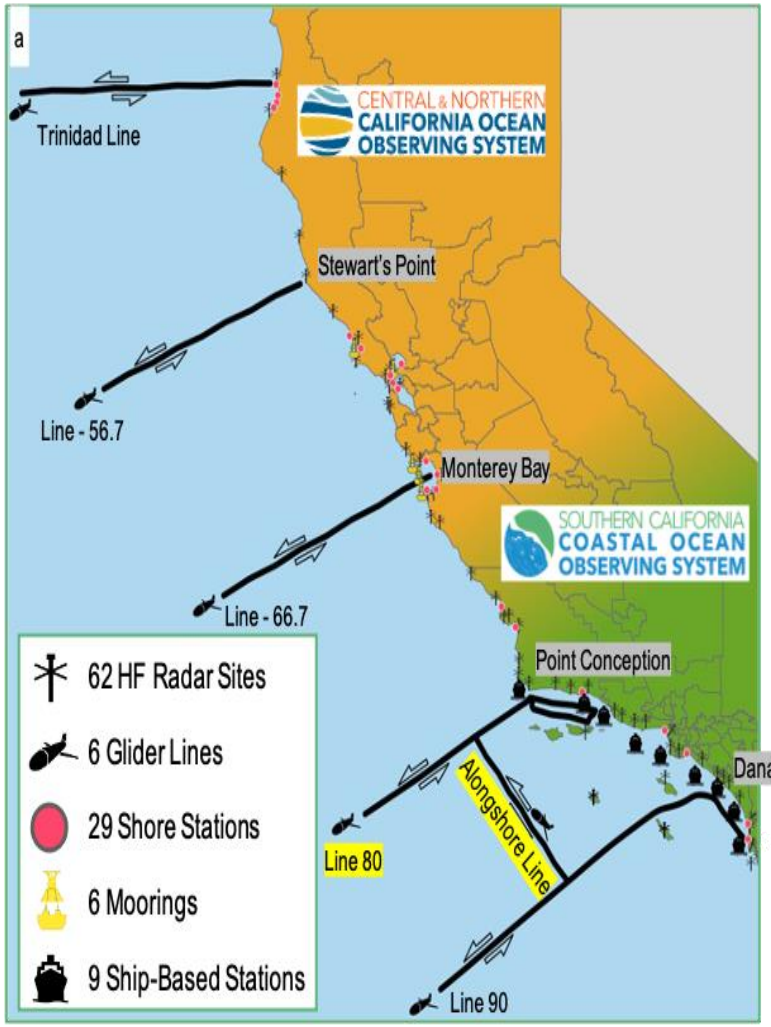
DOI: 10.21238/S8SPRAY7292

Rudnick, SIO

California Underwater Glider Network

Steric Height Anomaly
(local effects of SLR/warming)





Highlighted in yellow are SCCOOS funded glider lines.

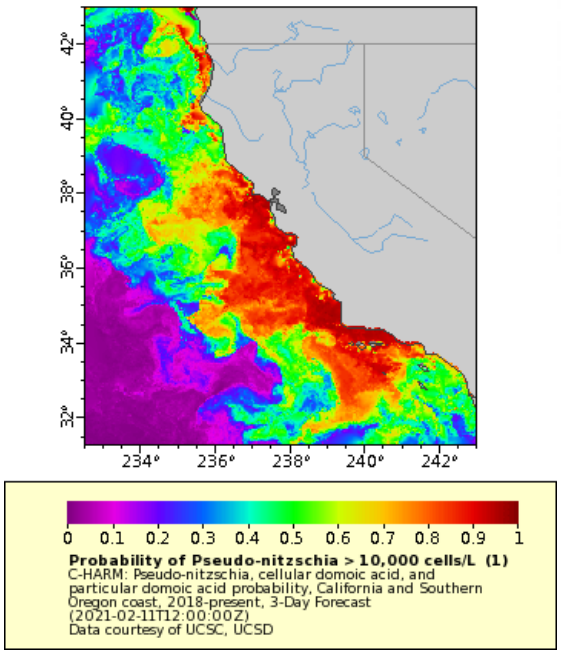
https://spraydata.ucsd.edu/SoCal-index/

DOI: 10.21238/S8SPRAY7292

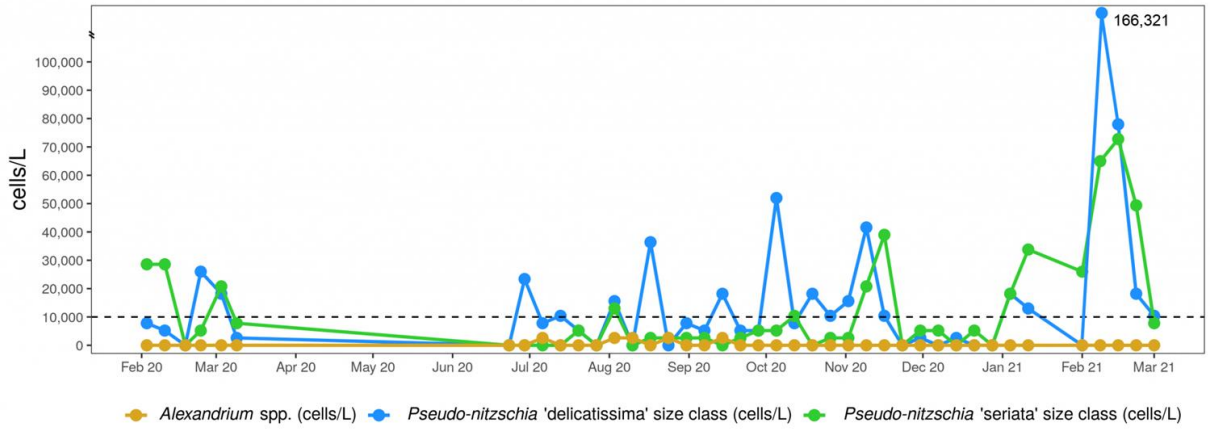
Rudnick, SIO

CA HAB Bulletin

C-HARM Probability of *Pseudo-nitzschia* Bloom for Feb 2021

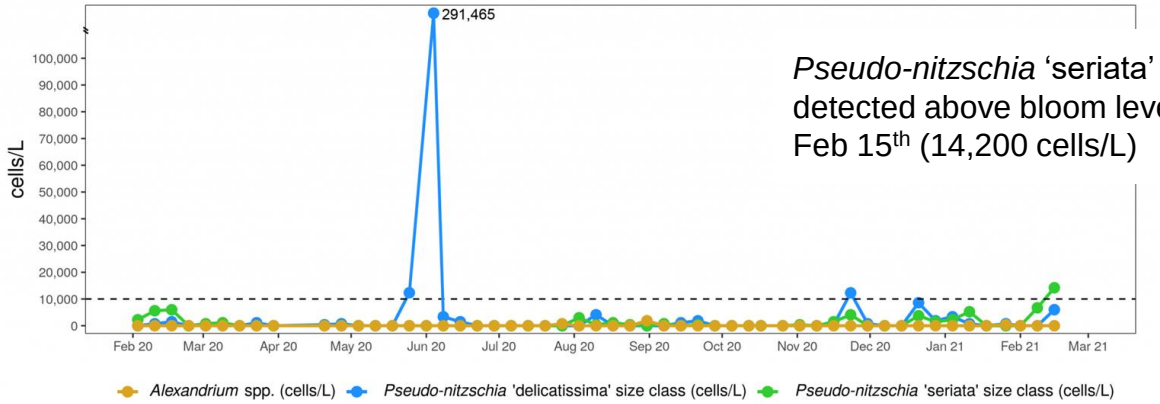


Newport Pier HAB and DA Data



Pseudo-nitzschia 'seriata' (larger, more toxic size class) and *Pseudo-nitzschia* 'delicatissima' (smaller, less toxic size class) were detected above bloom levels on Feb 8th, 15th & 22nd.

Santa Monica Pier HAB and DA Data

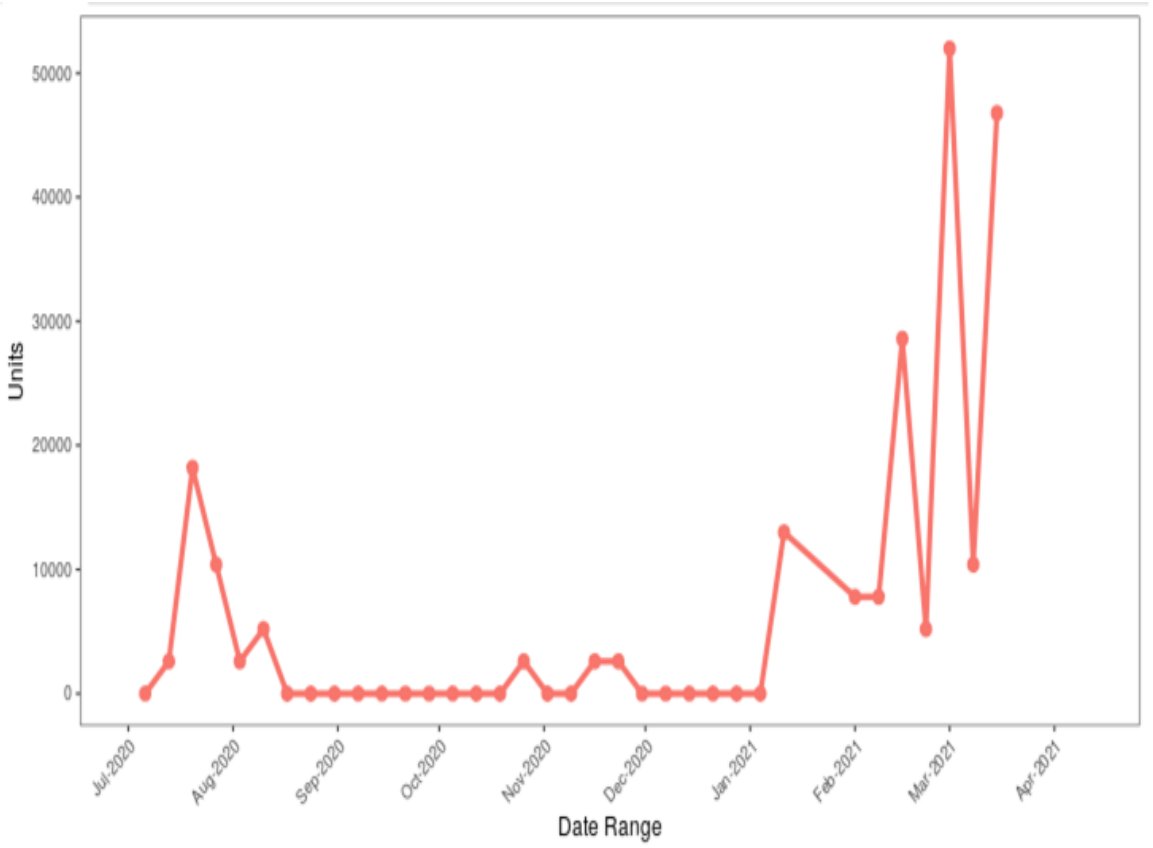


Pseudo-nitzschia 'seriata' was detected above bloom levels on Feb 15th (14,200 cells/L)

sccoos.org/california-hab-bulletin/

Harmful Algal Bloom Monitoring Alert Program (HABMAP)

Newport Pier *Lingulodinium polyedra* bloom



Crescent Beach in Laguna on Mar 17 2021. Photo: Girardeau, Orange County Outdoors.

Manhattan Beach Pier, Mar 2021. Photo: Girardeau, Orange County Outdoors.

CA IFCB Network - HAB Automated Early-Warning System

Top: Socially distanced in-person IFCB training workshop at Scripps Institution of Oceanography on 11-Feb 2021. Bottom Left image: Instillation of an IFCB at Scripps Pier. Bottom Right image: McLane Laboratories, Inc. building six new IFCBs as part of the California network.

By this summer 11 Imaging FlowCytobot (IFCB) units will be deployed on California piers, offshore moorings, and research cruises, for automated, real-time HAB monitoring in coastal waters.

Upcoming New IFCB Deployments:

April 2021
- Scripps Pier
- Del Mar Mooring

May 2021
- Newport Pier
- MBARI M1 Mooring

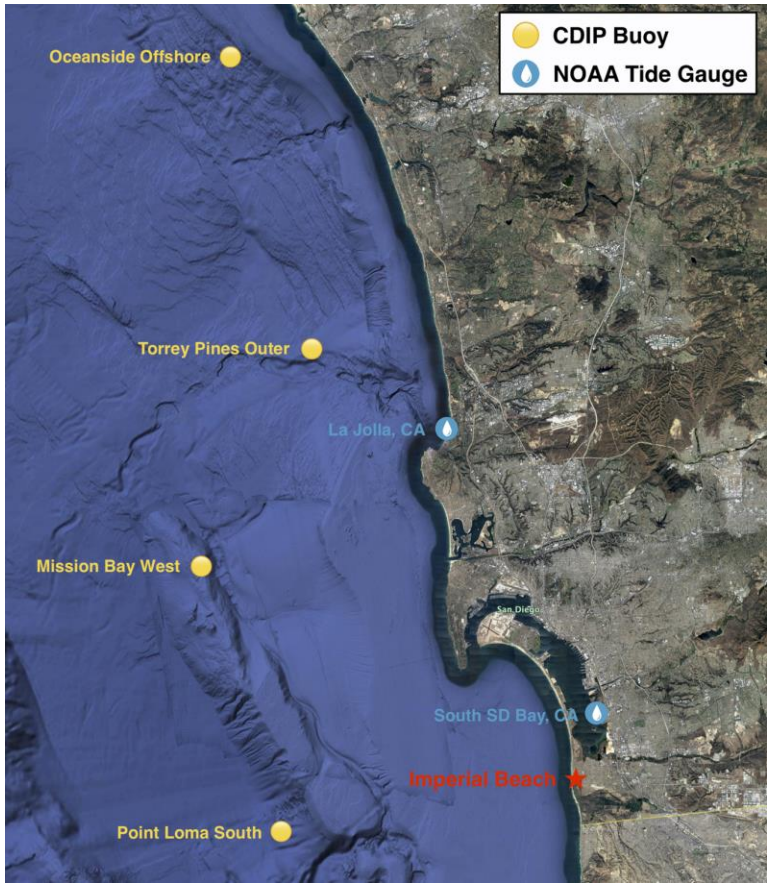
June 2021
- Stearns Wharf
- Bodega Pier
- Trinidad Pier

IOOS NCCOS

OCSAN ORANGE COUNTY SANITATION DISTRICT

OCEAN PROTECTION COUNCIL

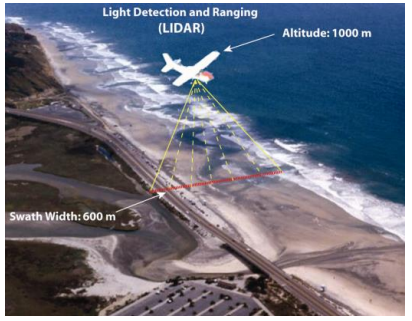
Coastal Solutions Workshop: Coastal Flood Modeling, Prediction, and Observations for the U.S. West Coast



March 31st and April 1st, 2021 - two day virtual workshop
>100 Participants

Coastal Hazards: Southern California Case Studies

- **CDIP Buoy-Driven CA Wave Model -** J. Behrens, SIO
- **Imperial Beach Flood Forecast System** - M. Merrifield, SIO
- **Resilient Futures: San Diego Bay** - A. Rodriguez, SIO
- **Operational Total Water Level forecasts for the U.S. west coast** - USGS and NOAA NCEP
- **TESLA** (Time-varying Emulator for Short- and Long-term Analysis of coastal flooding) - P. Ruggiero, OSU
- **Coastal Storm Modeling System** (CoSMoS) - P Barnard, USGS
- **Compound Coastal Flood Modeling at Surfside-Sunset** - B. Tang, UCLA
- **Climate-based statistical Modeling of Monthly Mean Sea Level** - S. Ortega, *Universidad de Cantabria*



oceanvisions.org/2021-west-coastal-solutions

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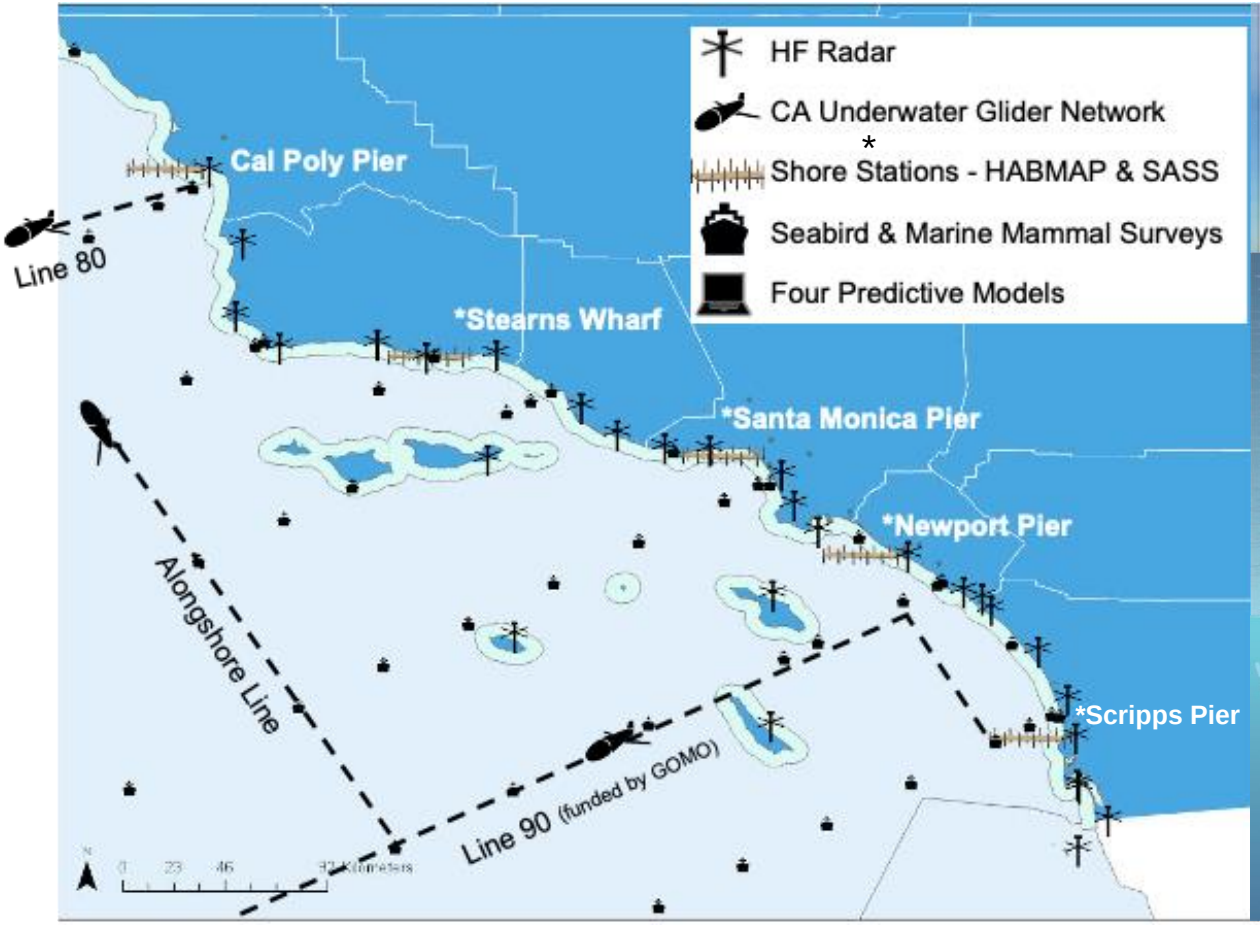
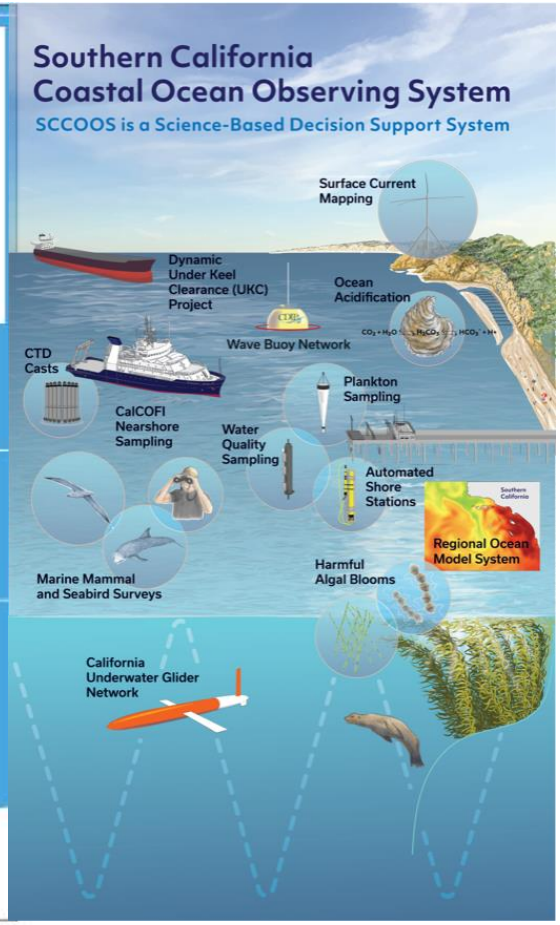
SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM





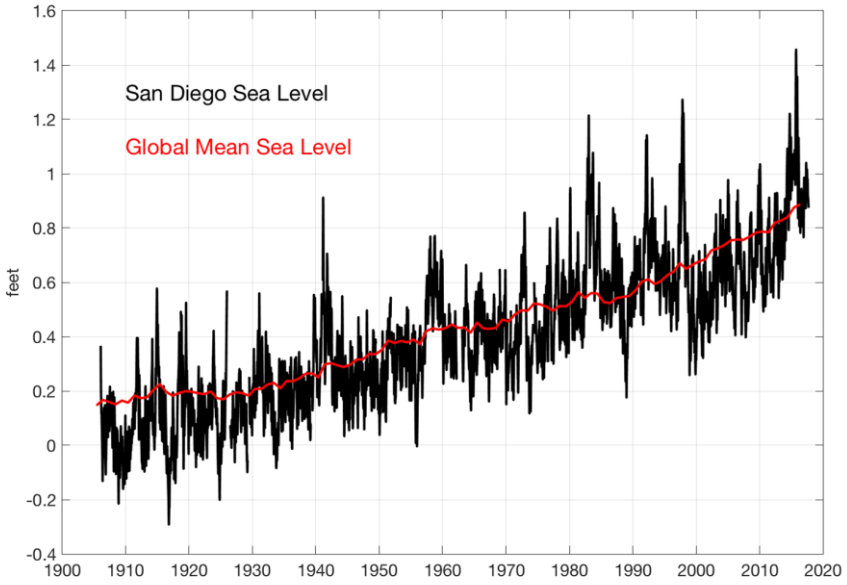
Questions?

Dr. Clarissa Anderson

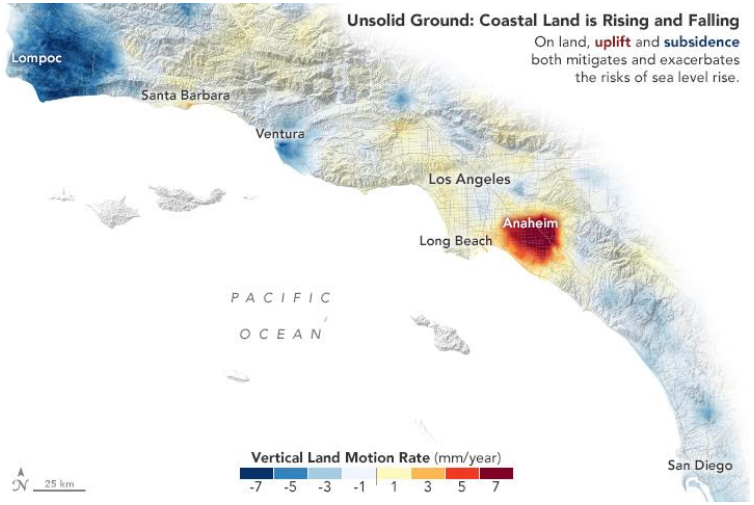
clrander@ucsd.edu

IOOS Integrated Ocean Observing System

Coastal Solutions Workshop: Coastal Flood Modeling, Prediction, and Observations for the U.S. West Coast



San Diego sea level has risen by ~10 inches since 1906, slightly faster than the estimated global rate. Difference likely due to local ground motion.



https://earthobservatory.nasa.gov/images/147436/taking-a-measure-of-sea-level-rise-land-motion

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- **Next webinar: Tuesday, July 20th 2021**

THANK YOU!