NOAA West Watch

Reporting Regional Environmental Conditions & Impacts in the West

April 21, 2020

Call Agenda

- **Project Recap & Updates (Dan McEvoy)**
- Regional Climate and ENSO brief (Dan McEvoy)
- Guest speaker: Dr. Christine Albano: *Using Satellite Remote Sensing and Climate Data to Assess Status and Trends of Groundwater Dependent Vegetation in Nevada*
- IOOS Nearshore Conditions brief (Jan Newton, Alex Harper, 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 2020 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).

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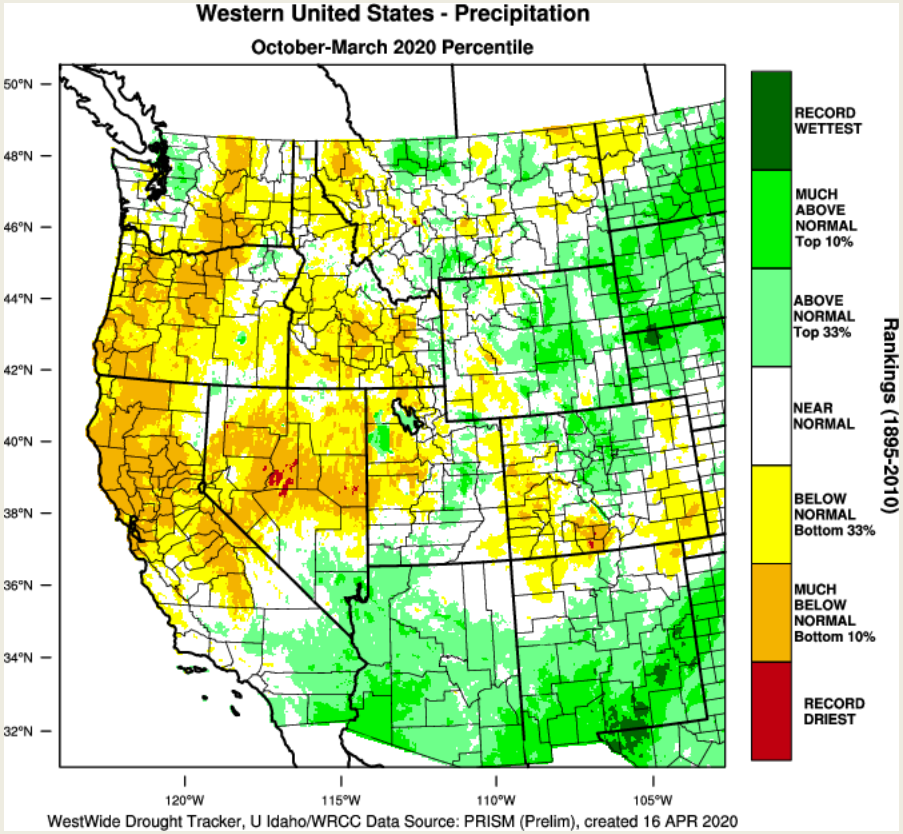
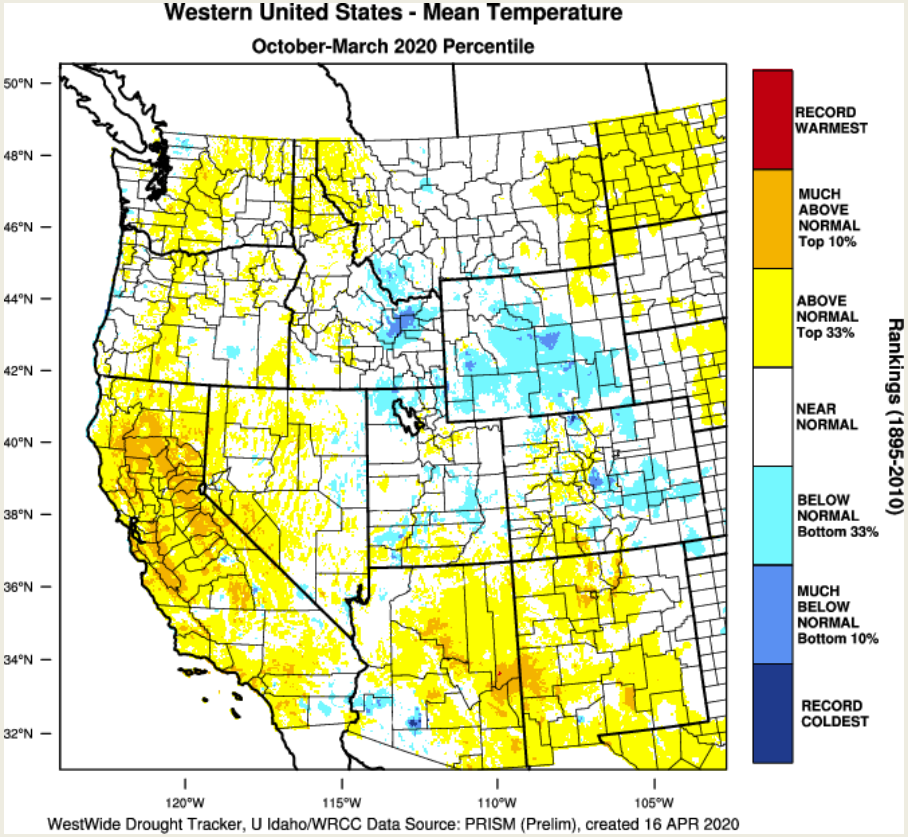
October-March Precipitation and Temperature

Precipitation Percentiles
October, 2019-March, 2020

Temperature Percentiles
October, 2019-March, 2020

Percentile ranking relative to 1895-2010

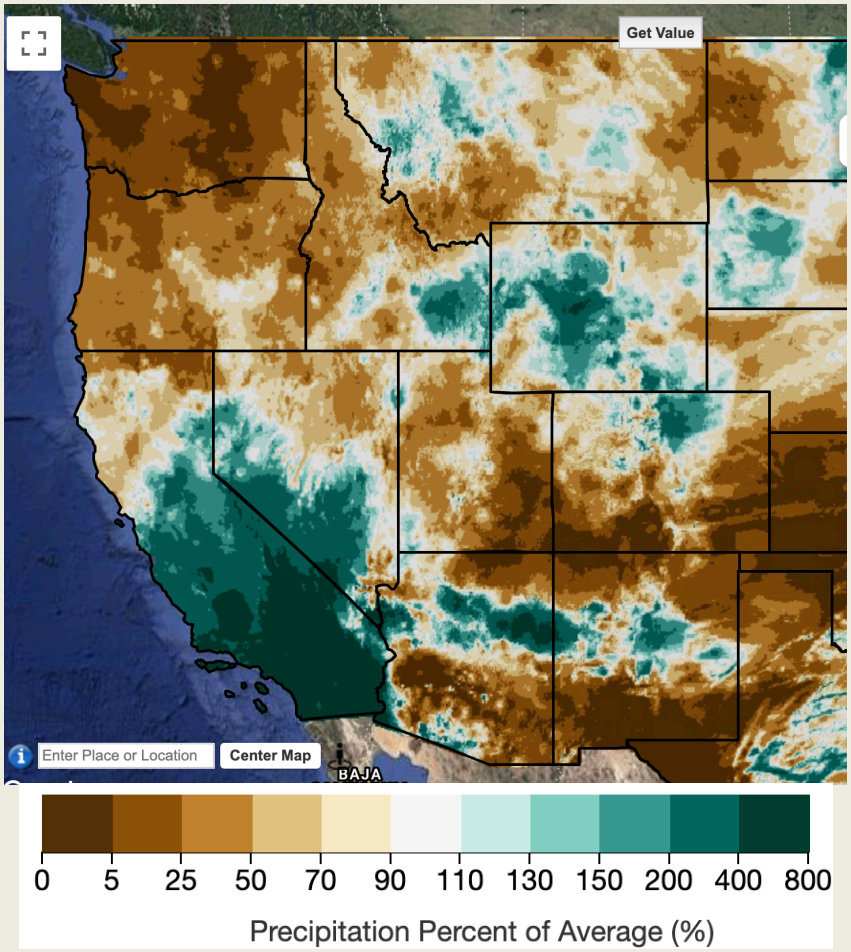




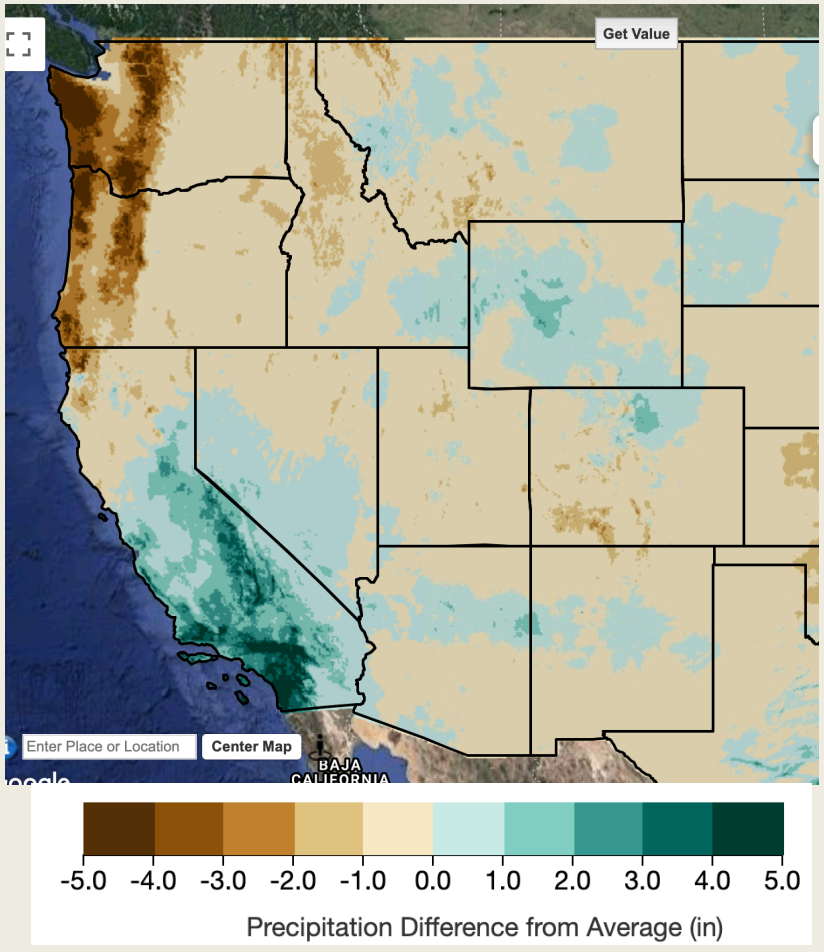
https://wrcc.dri.edu/wwdt/

April 1-17, 2020 Precipitation

Precipitation % of Normal

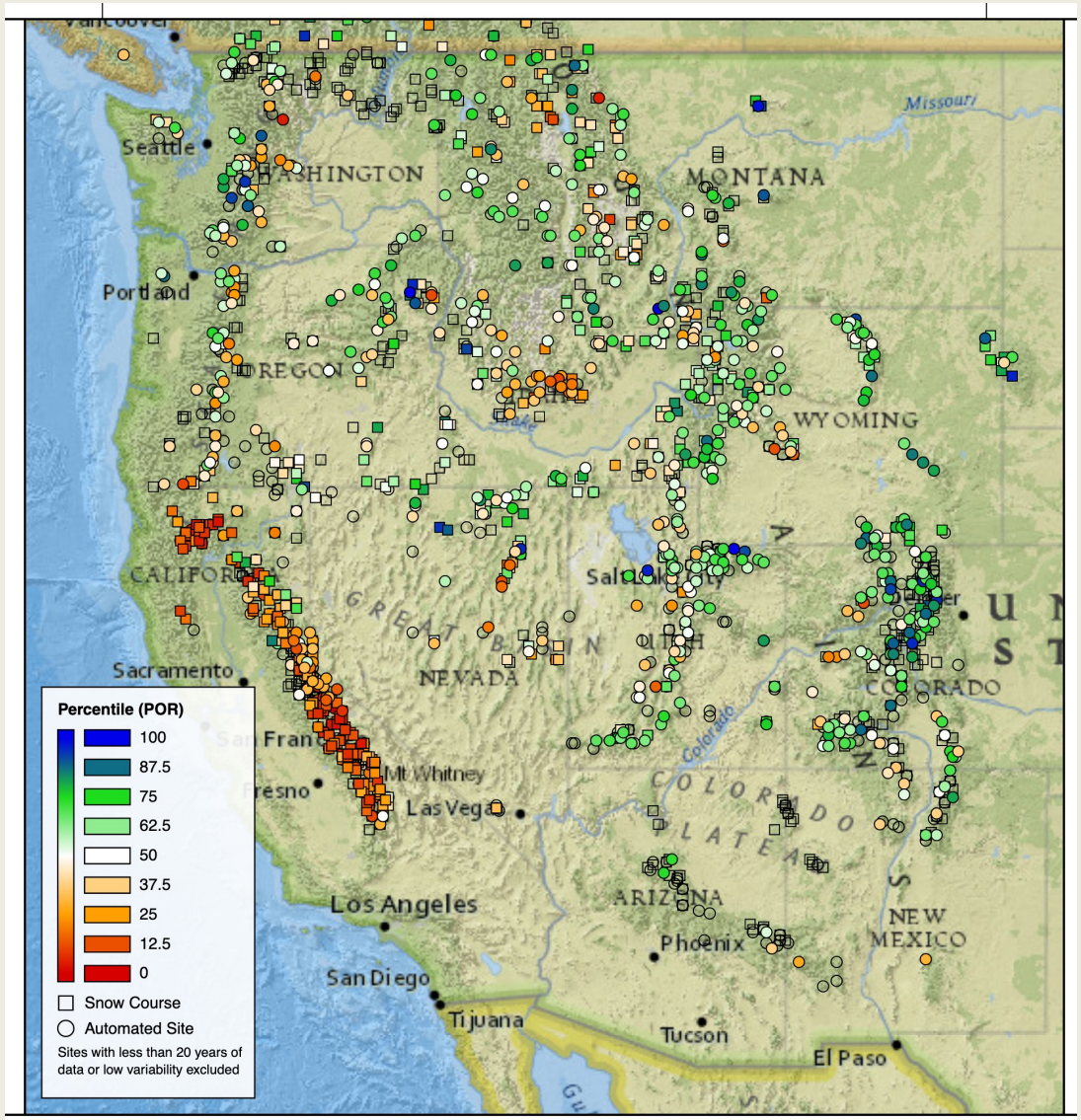


Precipitation Departure (Inches)



https://app.climateengine.org/climateEngine

Snowpack – April 1 Snow Water Equivalent Percentiles

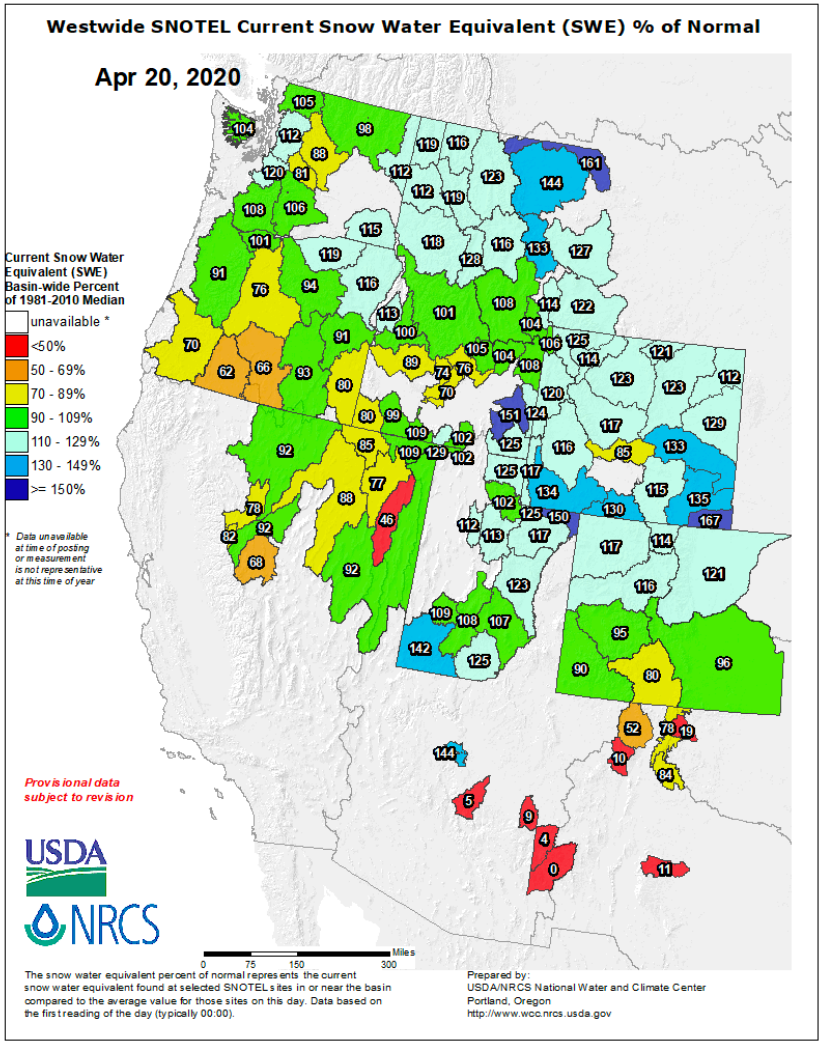


- Manual snow courses and automated snow pillows
- Record or near record low for many locations in central-southern Sierra Nevada and northwest California
- Good conditions overall in Colorado, Wyoming, and Utah
- Variable elsewhere

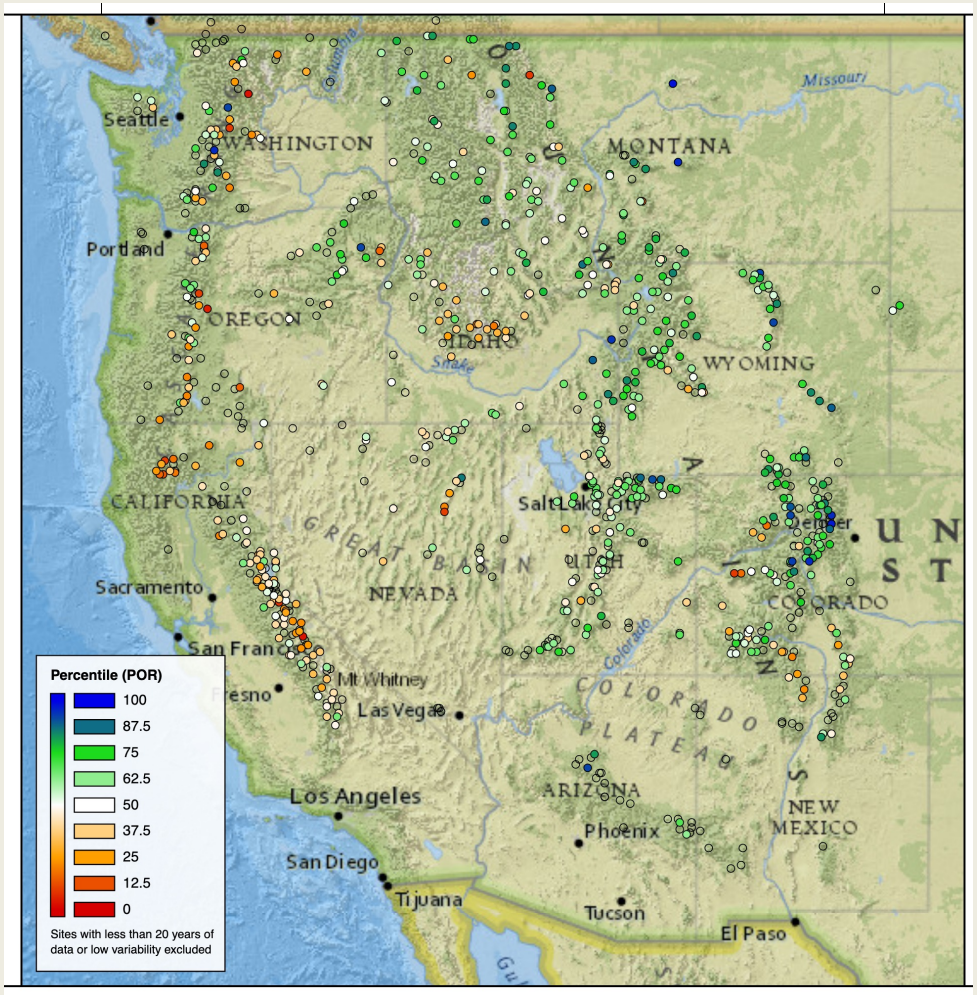
https://www.wcc.nrcs.usda.gov/snow/

Current Snowpack

April 20, SWE % of Normal

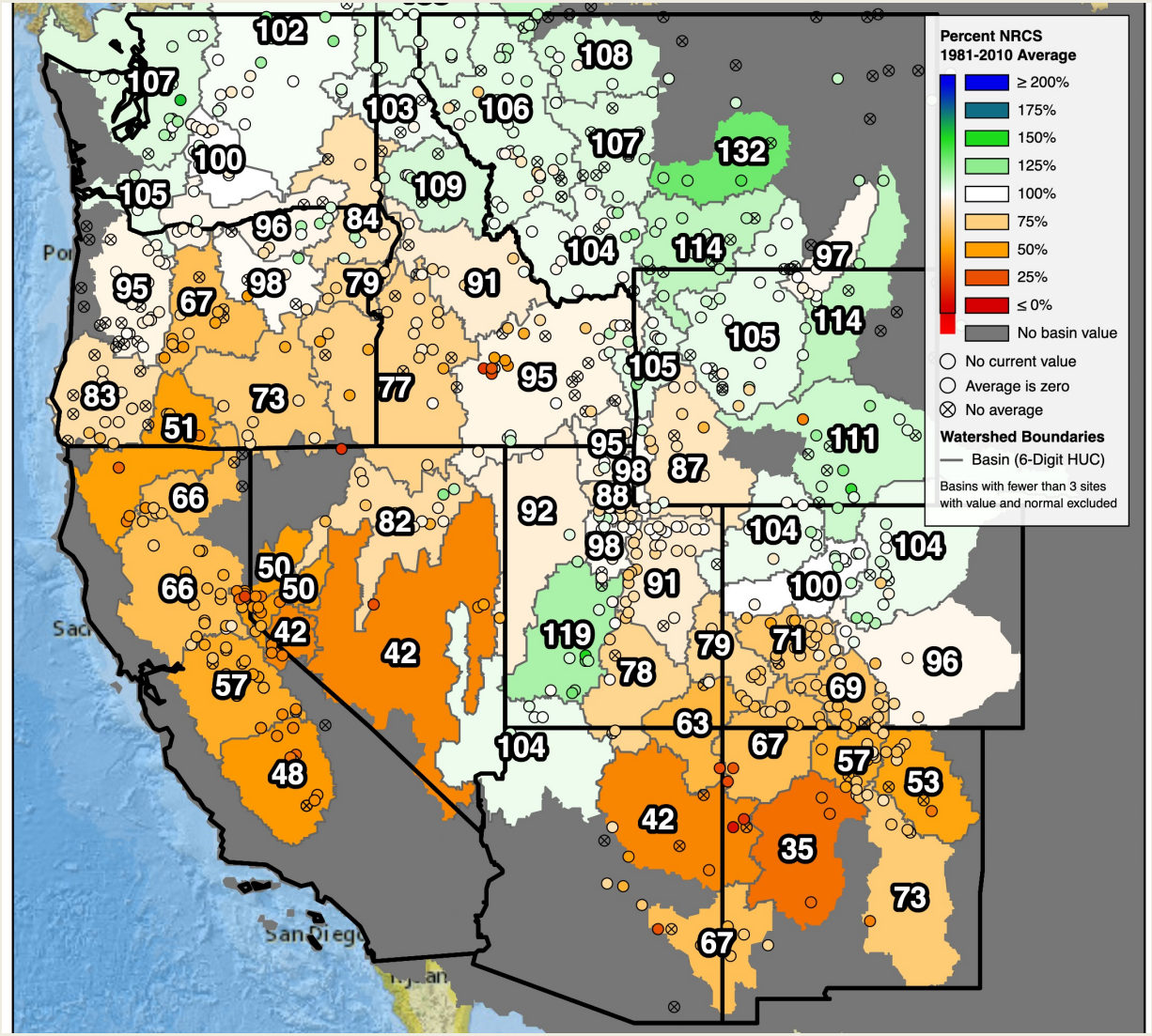


April 19, SWE Percentiles (Stations)



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

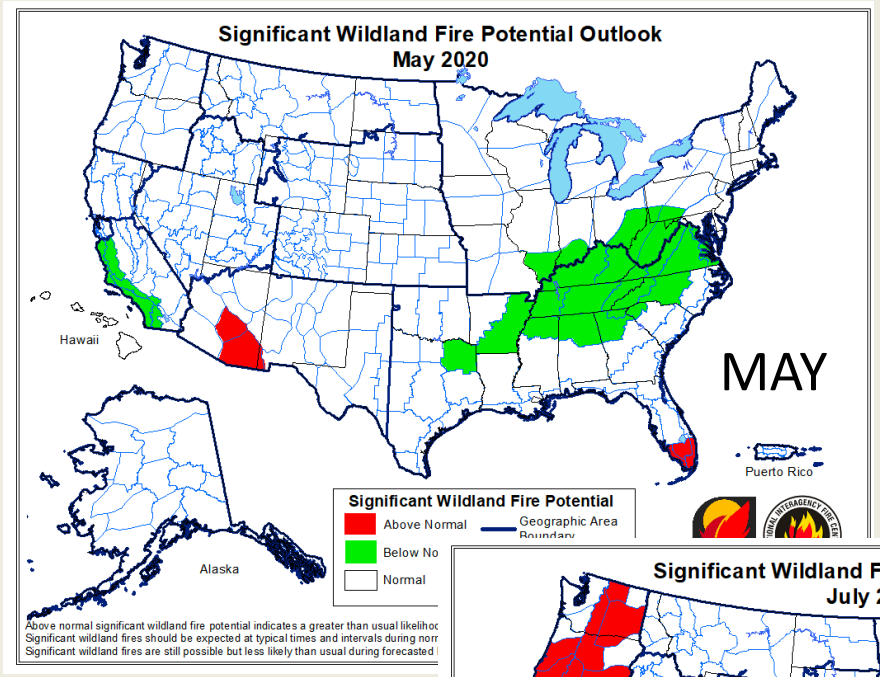
April-July Streamflow Forecasts

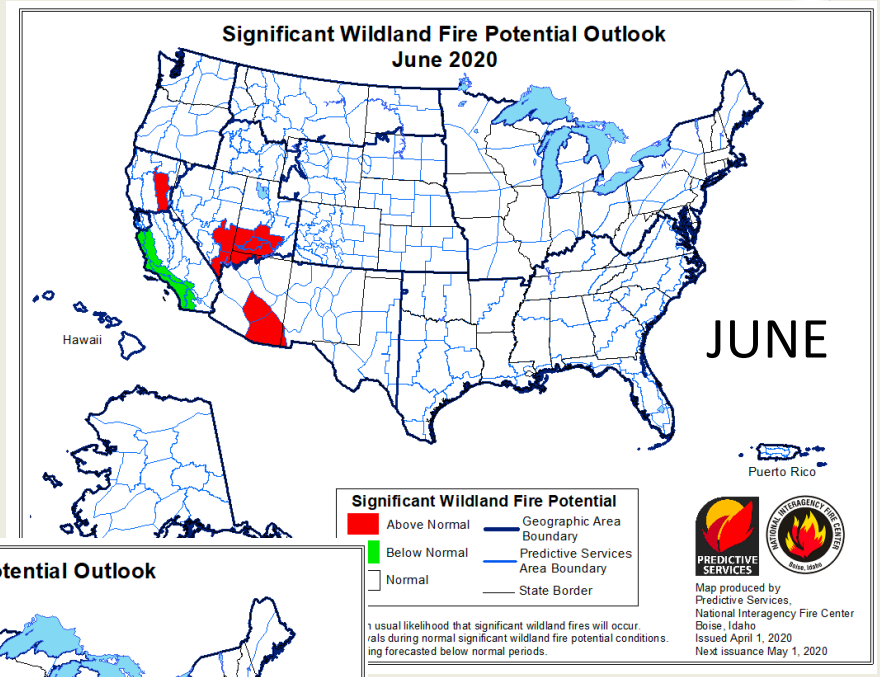


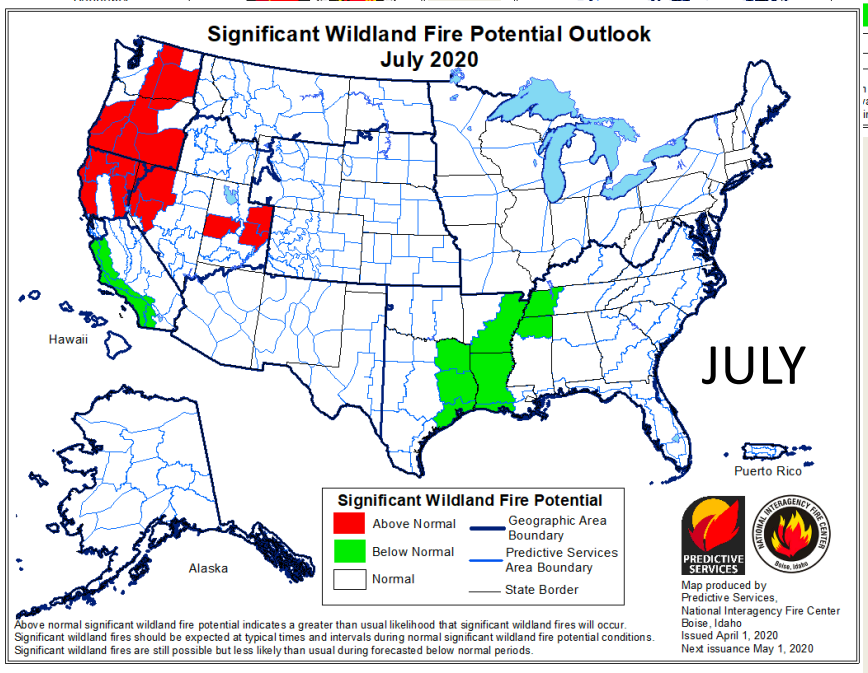
- April 1st 50% exceedance % of average forecasts
- Low flows predicted over most of Southwest, Great Basin and California
- Lake Powell Inflow Forecast: 74% of average

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

Significant Wildland Fire Potential Outlook







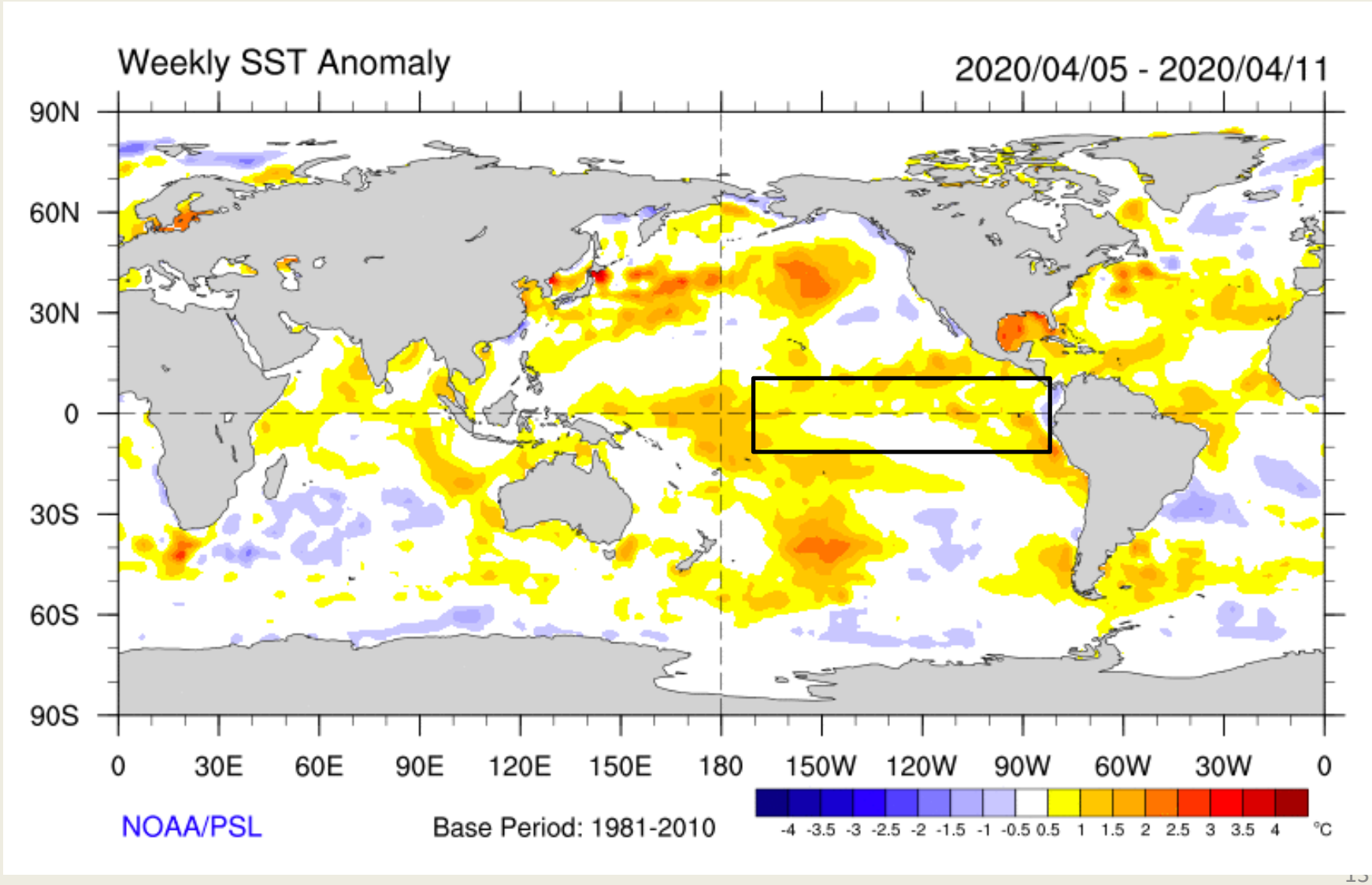
ENSO Status April 20, 2020

- ENSO-neutral conditions are present.*
- Equatorial sea surface temperatures (SSTs) are above average across most of the Pacific Ocean.
- The tropical atmospheric circulation is consistent with ENSO-neutral.
- ENSO-neutral is favored for the Northern Hemisphere summer 2020 (~60% chance), remaining the most likely outcome through autumn.*

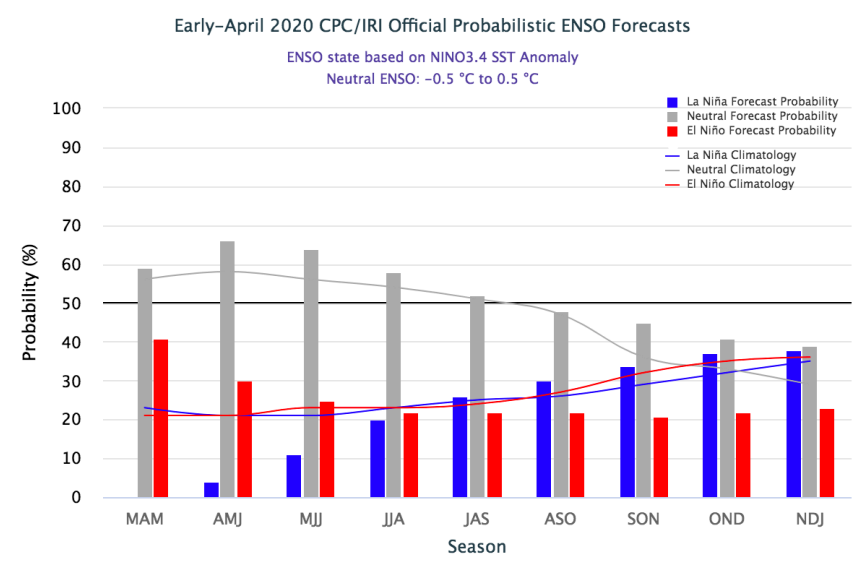
Credit: CPC

* 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/.

Sea Surface Temperatures



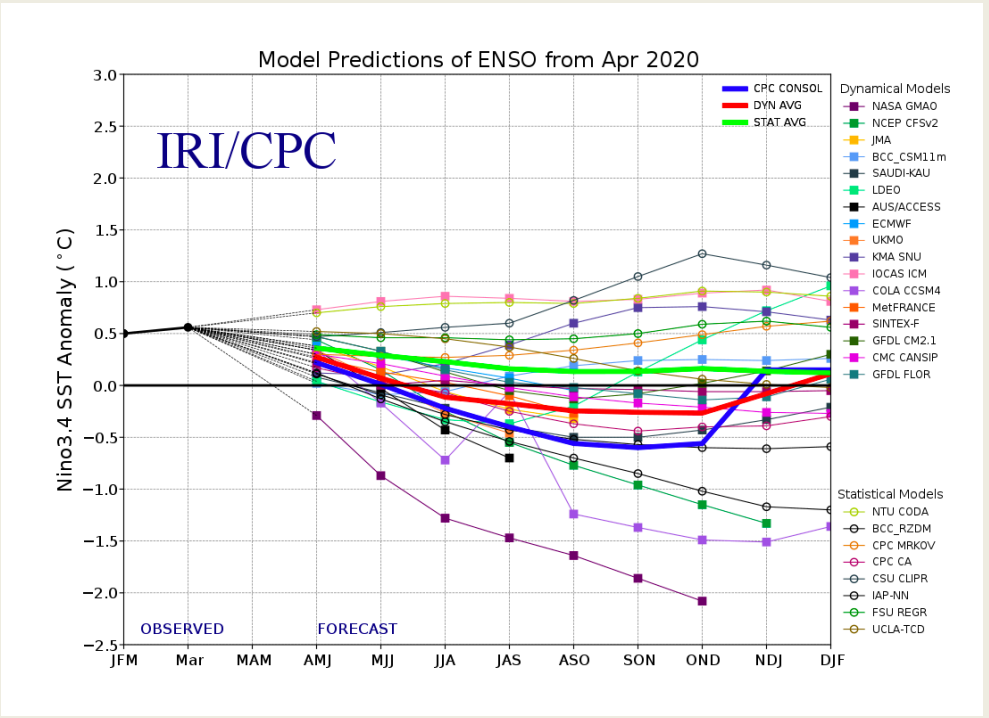
ENSO Forecasts



From CPC: ENSO-neutral is favored for the Northern Hemisphere summer 2020 (~60% chance), remaining the most likely outcome through autumn

CPC/IRI El Nino forecast:

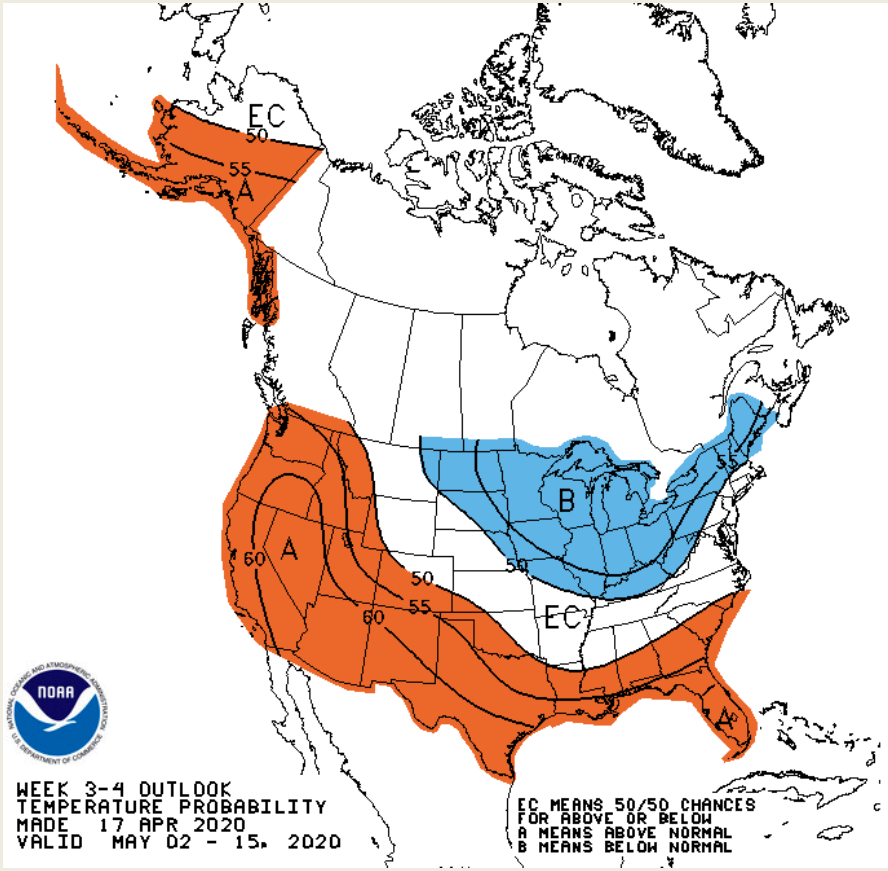
NMME models + other dynamical models + statistical models



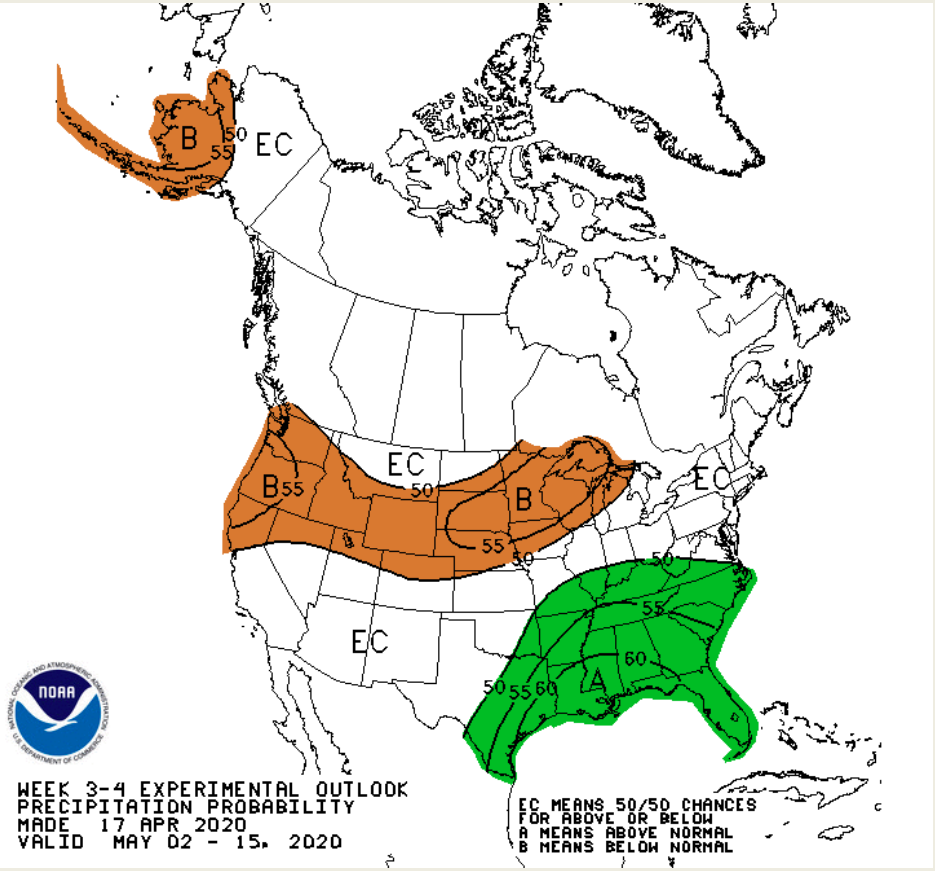
Source: CPC/IRI

May 2nd-15th 2020 U.S. Outlook

Temperature Probability



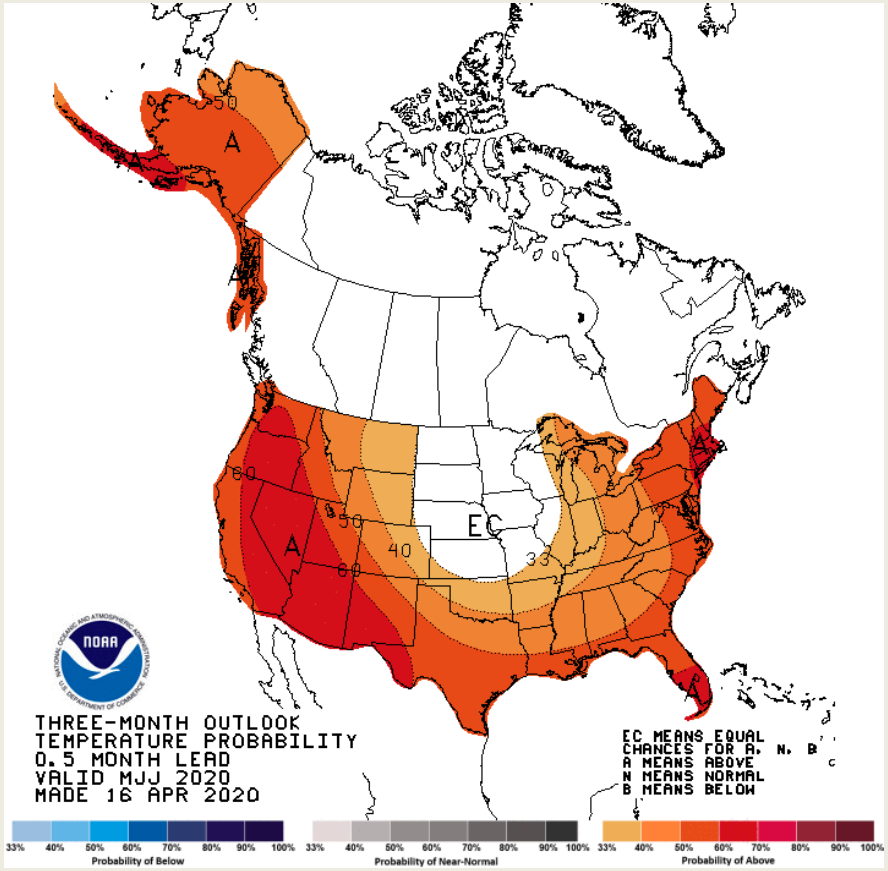
Precipitation Probability



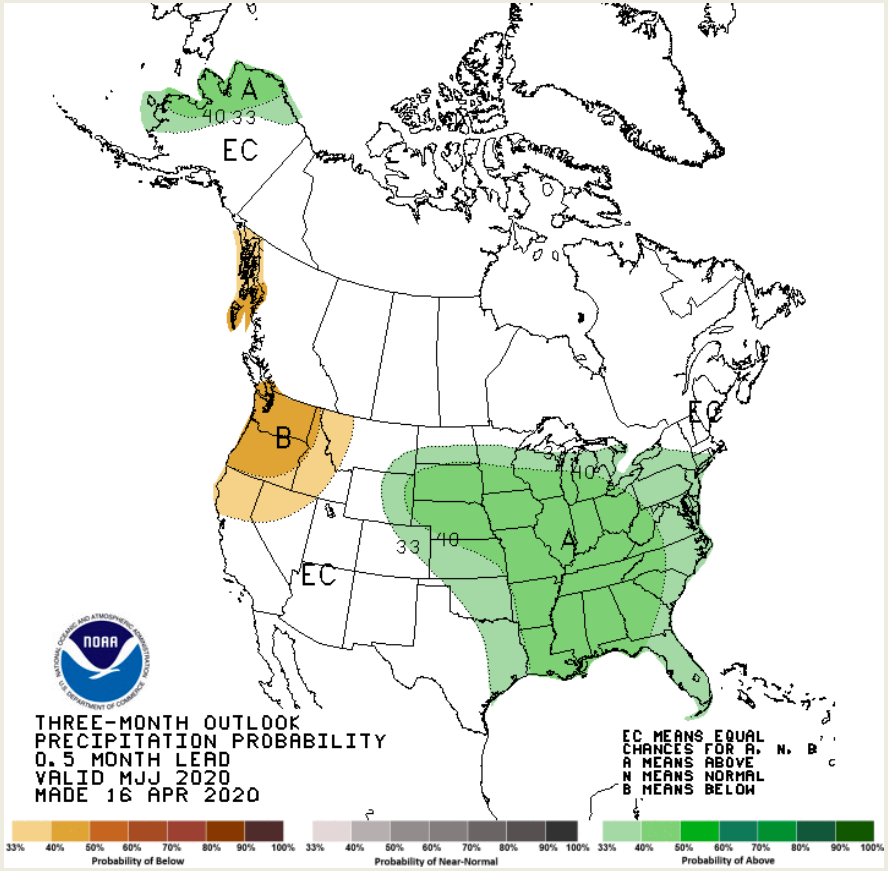
Source: NOAA/CPC

May-July 2020 Outlook

Temperature Probability



Precipitation Probability



Source: NOAA/CPC

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  - Additional impacts to share?

Using Satellite Remote Sensing and Climate Data to Assess Status and Trends of Groundwater Dependent Vegetation in Nevada

Christine Albano, Ken McGwire, Mark Hausner, Dan McEvoy, Blake Minor, Charles Morton, Justin Huntington

Desert Research Institute

Background

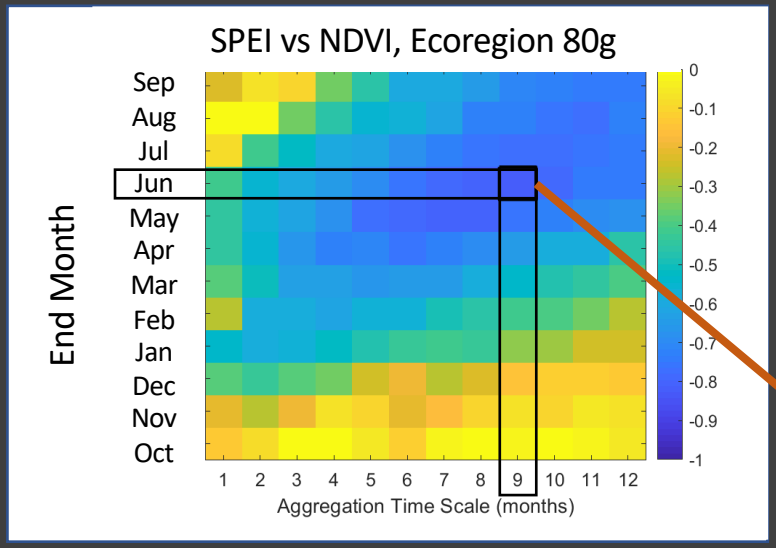
- Groundwater dependent ecosystems (GDEs) sustain much of the biodiversity in arid environments
- Long-term monitoring can be costly and resource intensive
- Difficult to separate effects of management actions from natural variability due to climate fluctuations
- Combining the Landsat archive with climate data provides new opportunities to address these challenges

Objectives

- Quantify and map drought-adjusted trends in riparian vegetation across Nevada based on a 34-year (1984-2018) record of Landsat satellite data
- Highlight locations that are likely influenced by management actions or disturbance

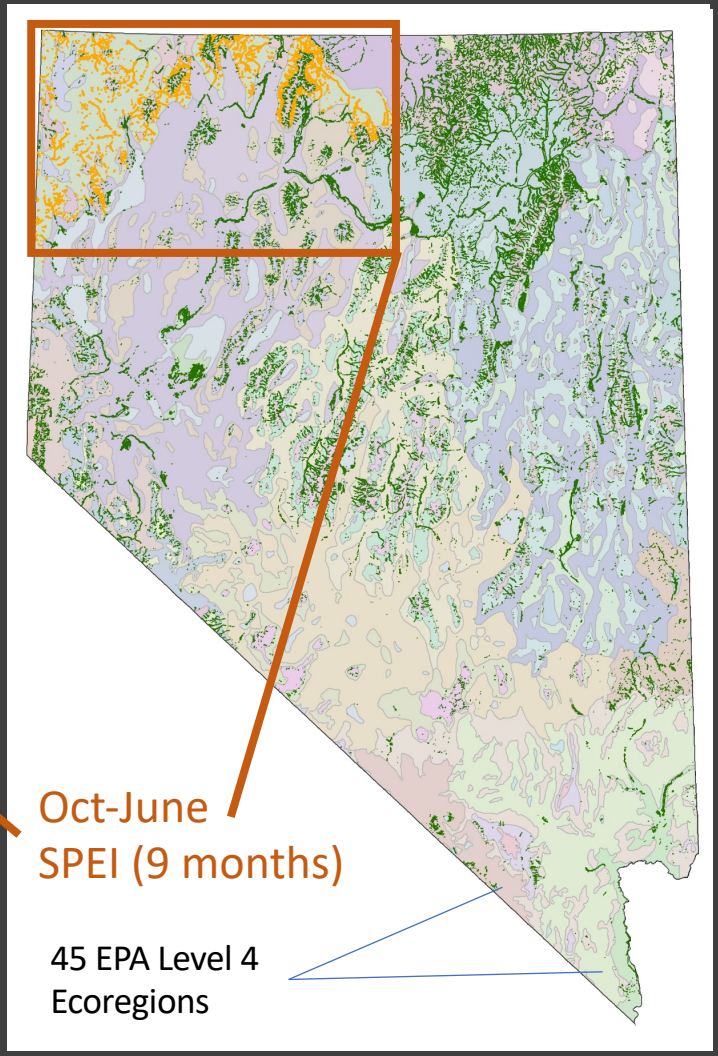
Approach

1. Quantify average drought-vegetation relationship in riparian pixels within 45 ecoregions (linear regression)



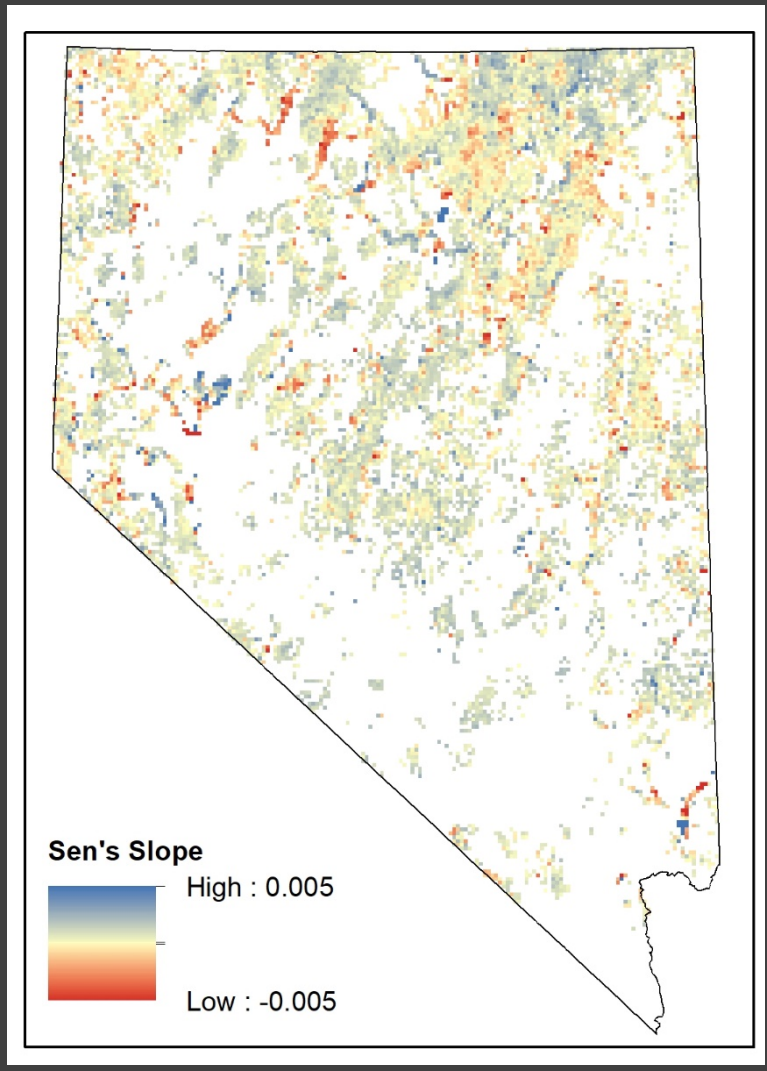
2. Apply relationship at the 30-m pixel scale

3. Assess 34-year (1984-2018) trends in residual unexplained variance in NDVI (Mann-Kendall test)



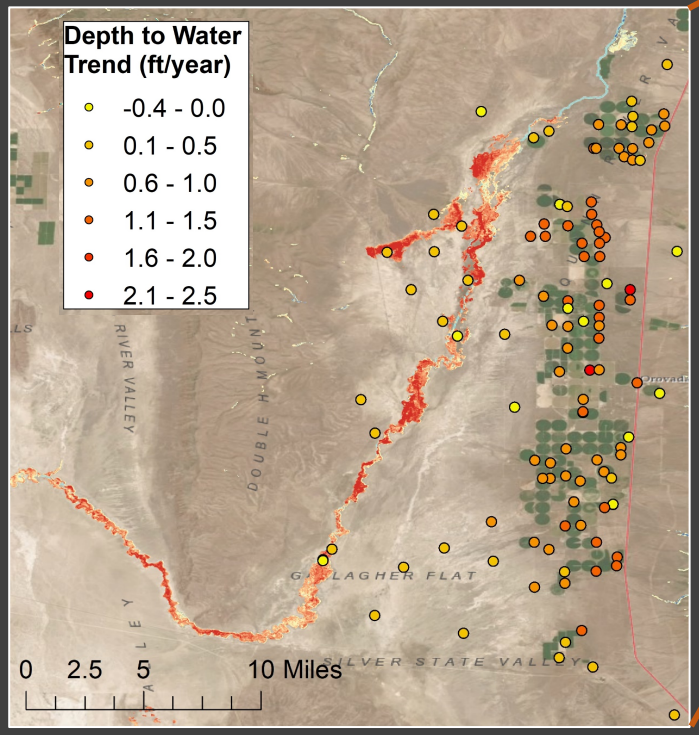
Drought-Adjusted Trends in Riparian Vegetation 1984-2018 (x100)

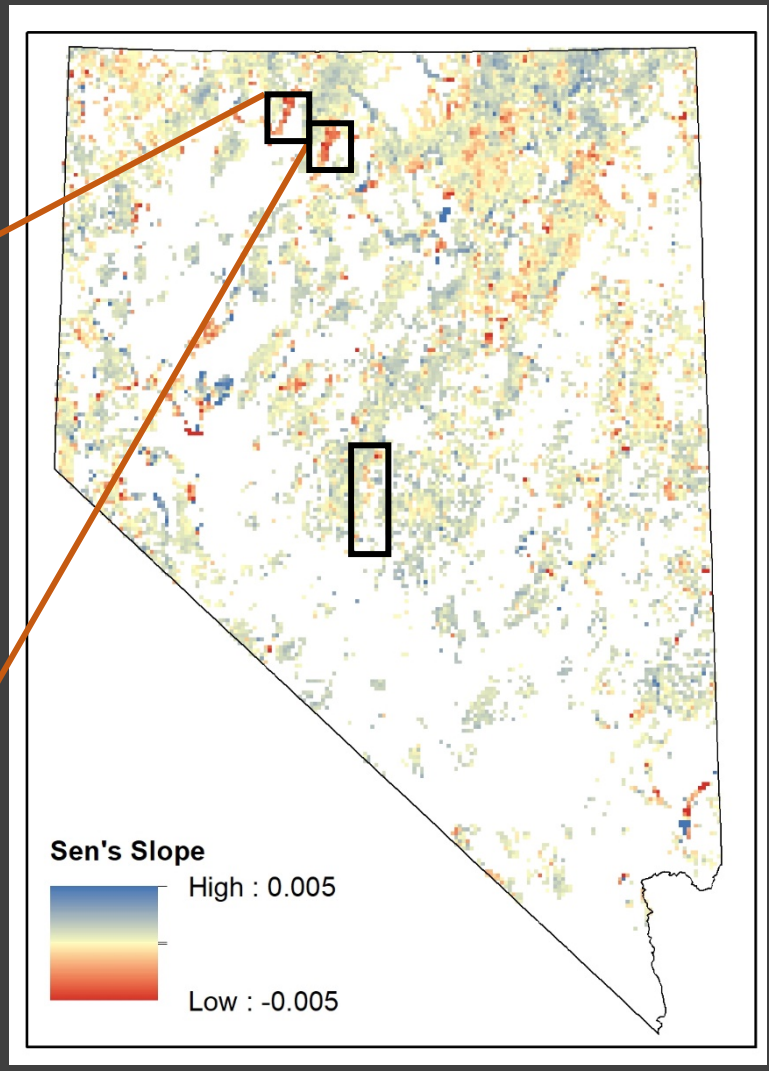
	After Drought-Adjustment	Before Drought-Adjustment
Positive ($p < 0.05$)	23%	19%
Negative ($p < 0.05$)	14%	11%
Not Statistically Significant	63%	70%



Identifying ‘Hotspots’ of Change

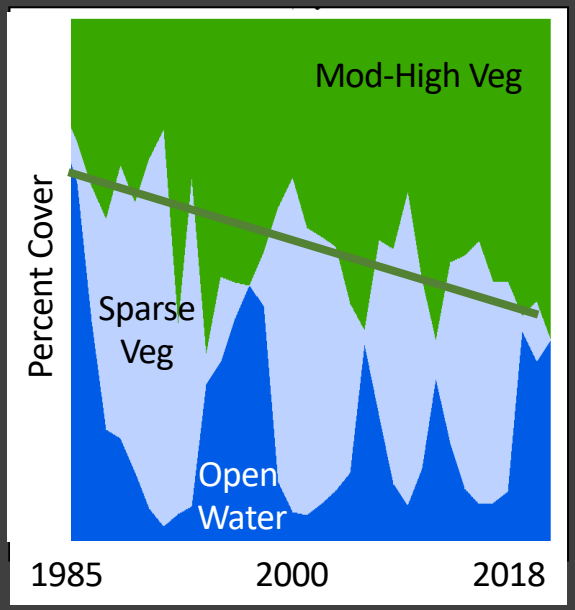
Potential groundwater withdrawal impacts along the Quinn River near Orovada, NV

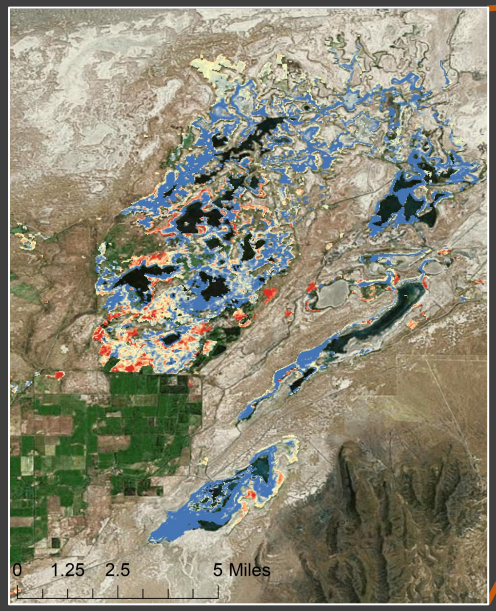


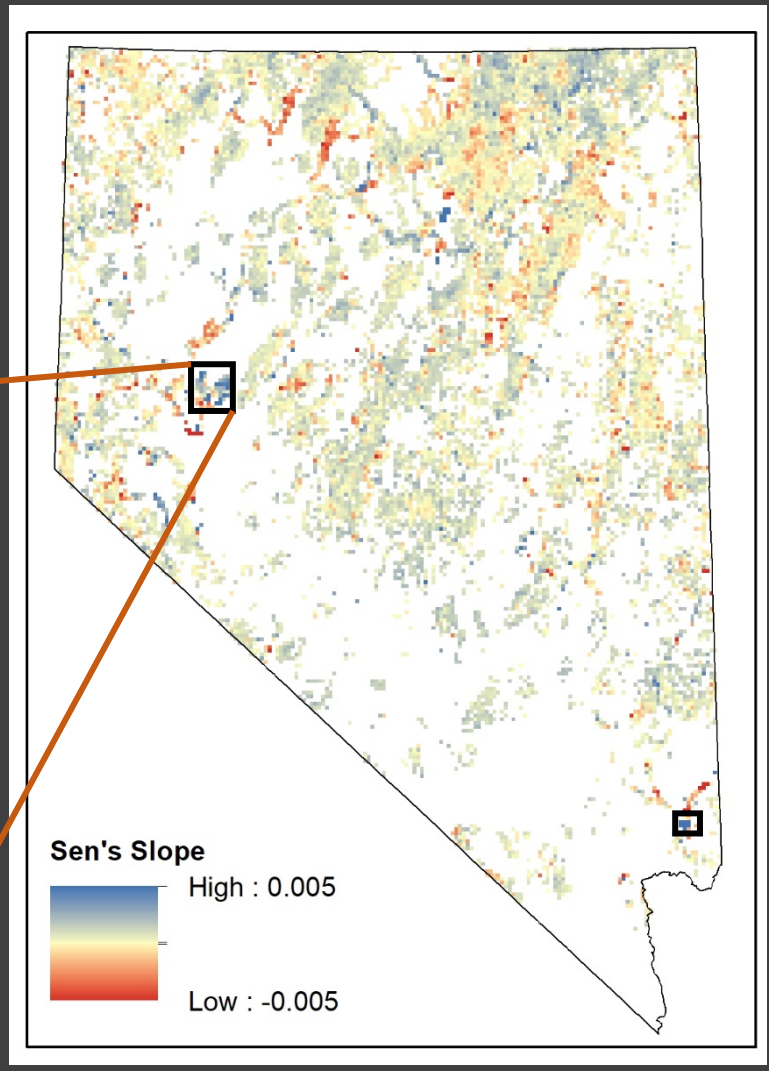


Identifying ‘Hotspots’ of Change

Changing surface water availability in the Stillwater National Wildlife Refuge



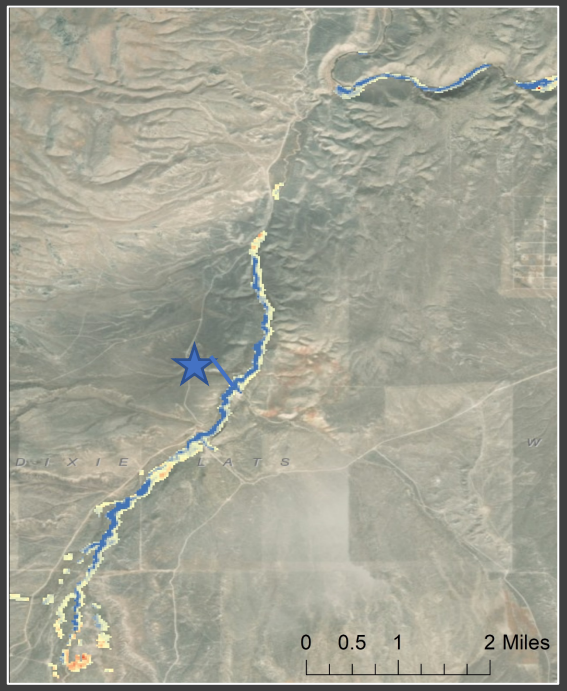


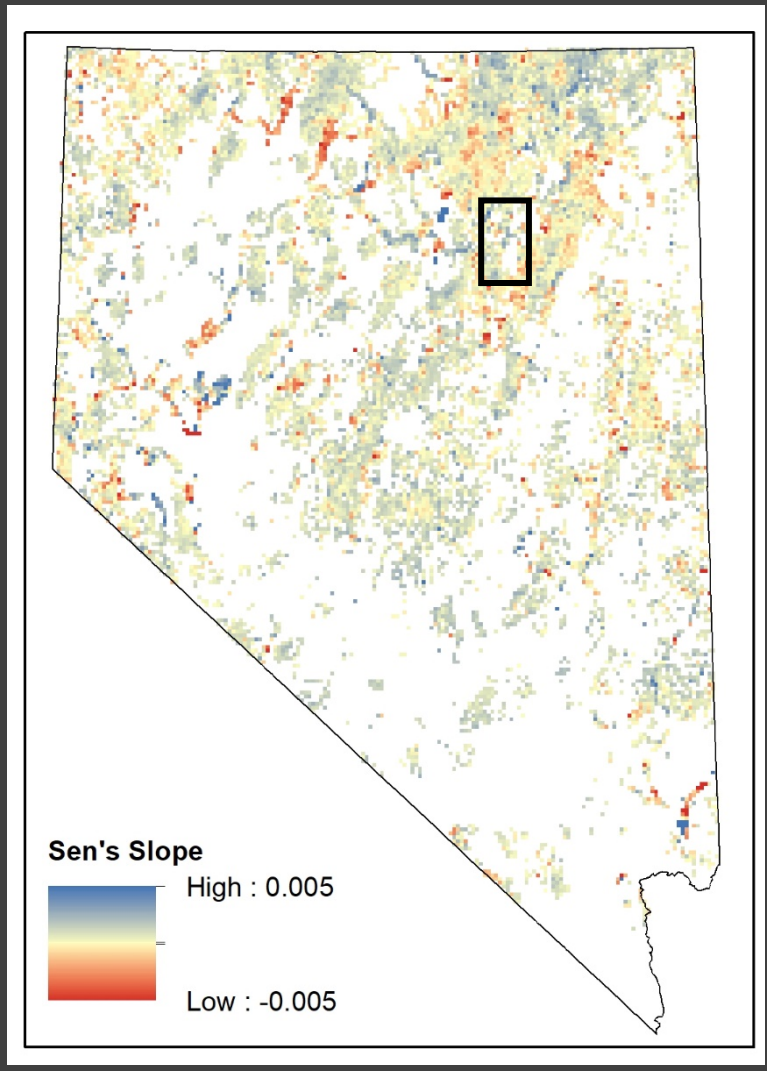


K. McGwire, unpub. data

Assessing Effects of Management Changes

Riparian response to changes in hot-season grazing regime along Dixie Creek (BLM Elko Field Office)

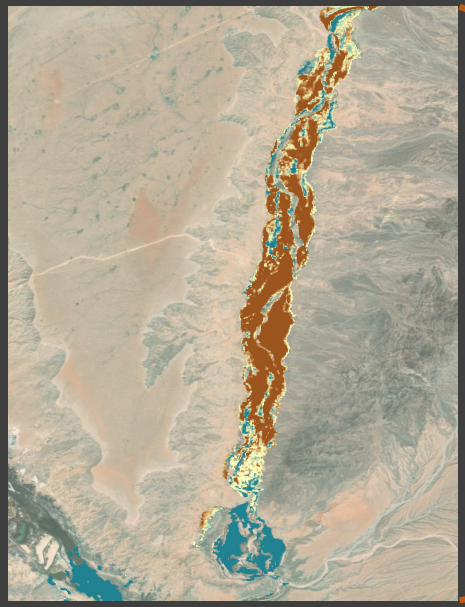


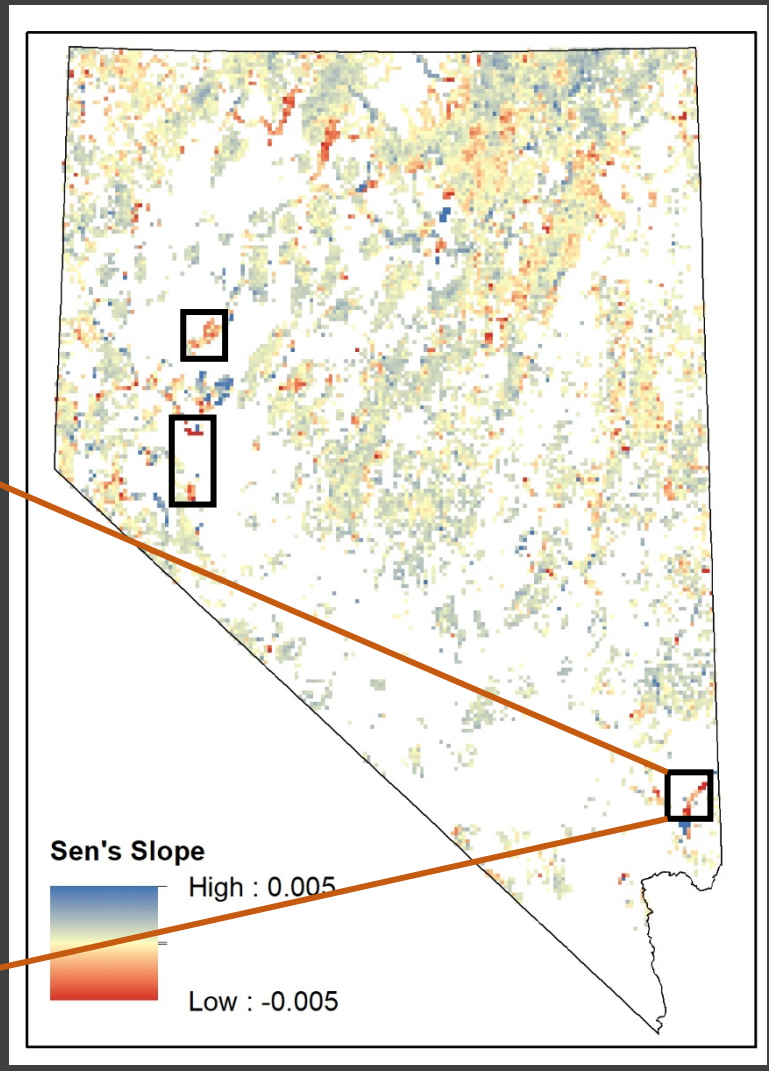


Assessing Effects of Management Changes

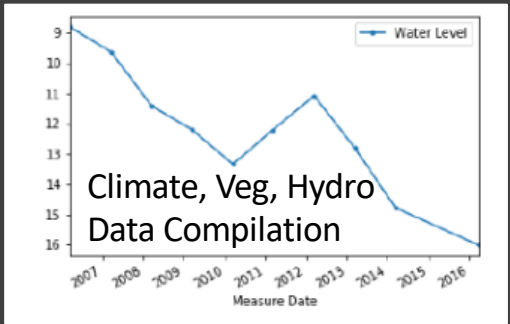
Tamarisk Biocontrol Effects

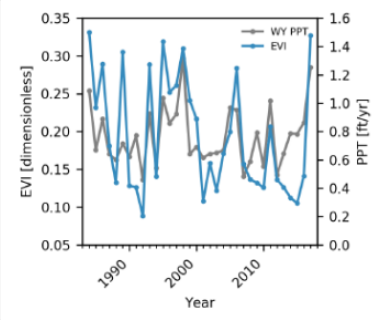
Lake Mead National Recreation Area

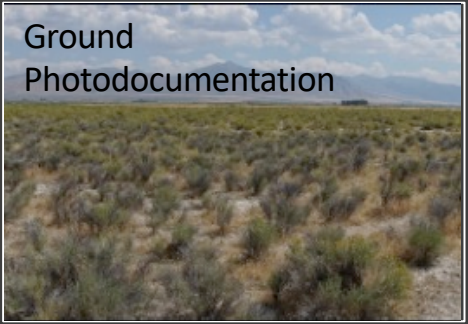


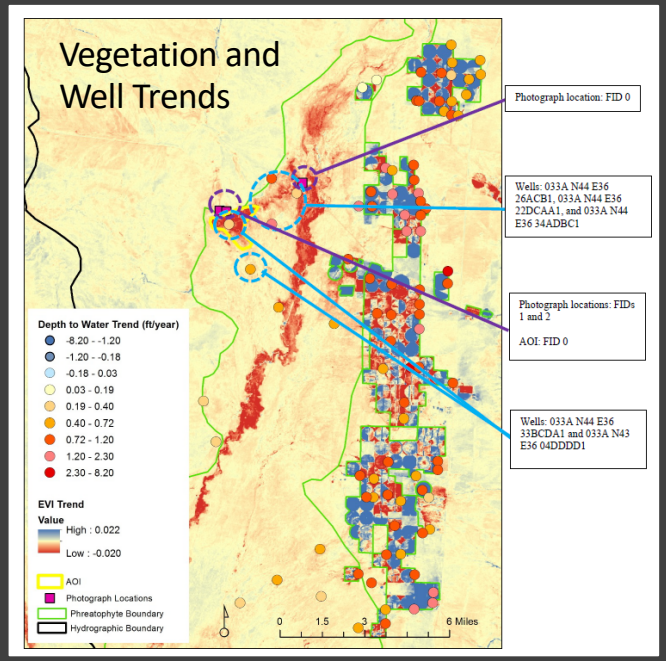


Field Reconnaissance and Ancillary Data Compilation









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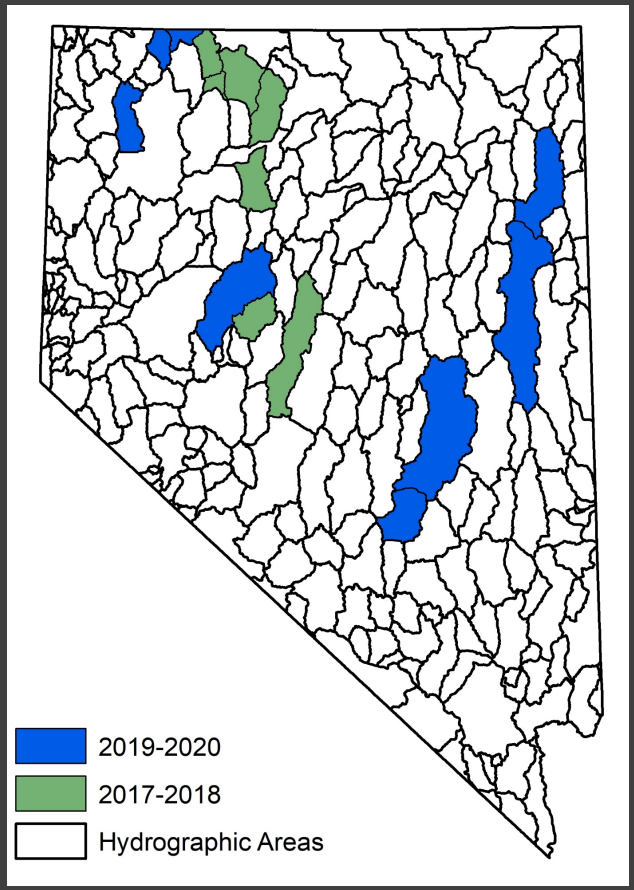

Spatiotemporal Reconnaissance Investigation of Phreatophyte Vegetation Vigor for Selected Hydrographic Areas in Nevada

Justin L. Huntington
Blake Minor
Matthew Bromley
Charles Morton

May 2018

Paradise Valley, NV

Prepared by
Division of Hydrologic Sciences, Desert Research Institute, Reno, NV

Prepared for
The Nature Conservancy

Conclusions

- Results highlight areas of disturbance and human impacts (degradation or restoration)
- Provide a unique long-term perspective on riparian change in Nevada
- Adjusting for drought status clarifies trends and strengthens basis for assessing other drivers of riparian change
- Field reconnaissance/more data needed to interpret results

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Acknowledgments

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

U.S.
FISH & WILDLIFE
SERVICE

NASA

USGS

The Nature Conservancy

https://tinyurl.com/trz7npd

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Northwest Association of Networked Ocean Observing Systems

NOAA West Watch Update 21 April 2020: Washington / Oregon Observations

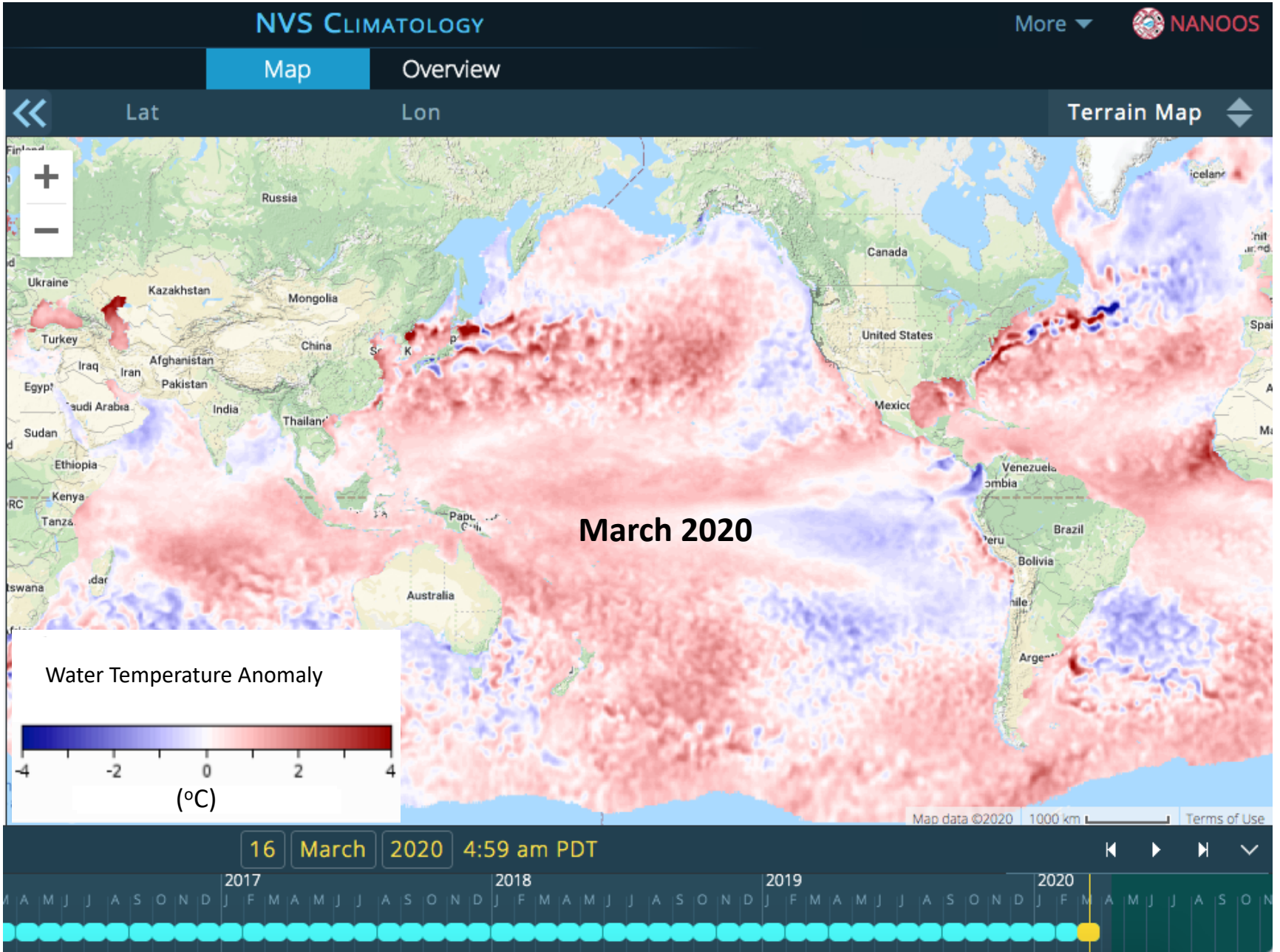
Jan Newton, NANOOS Executive Director

IOOS Integrated Ocean Observing System

www.nanoos.org

NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly
NCEI Optimum Interpolation SST



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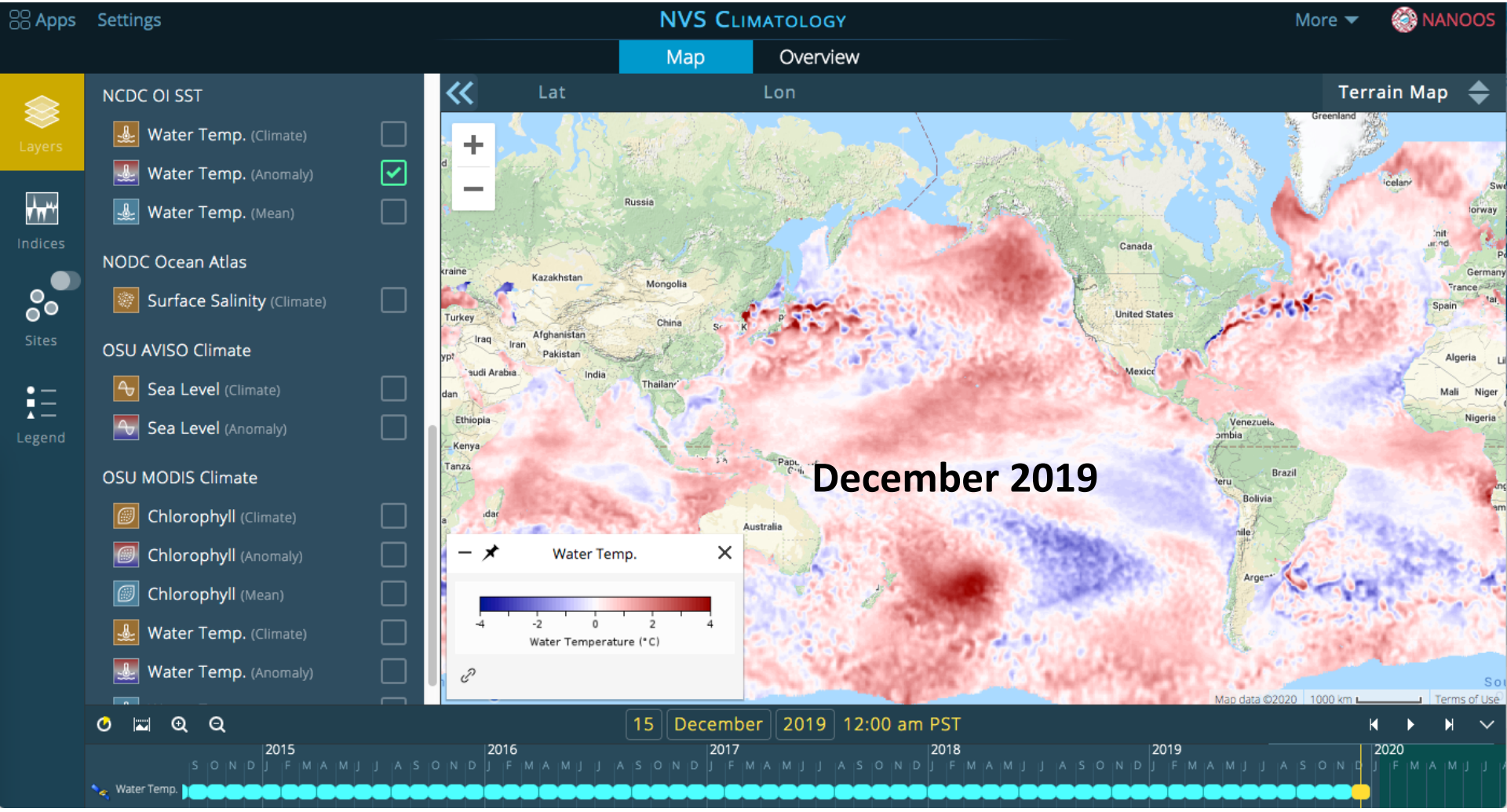

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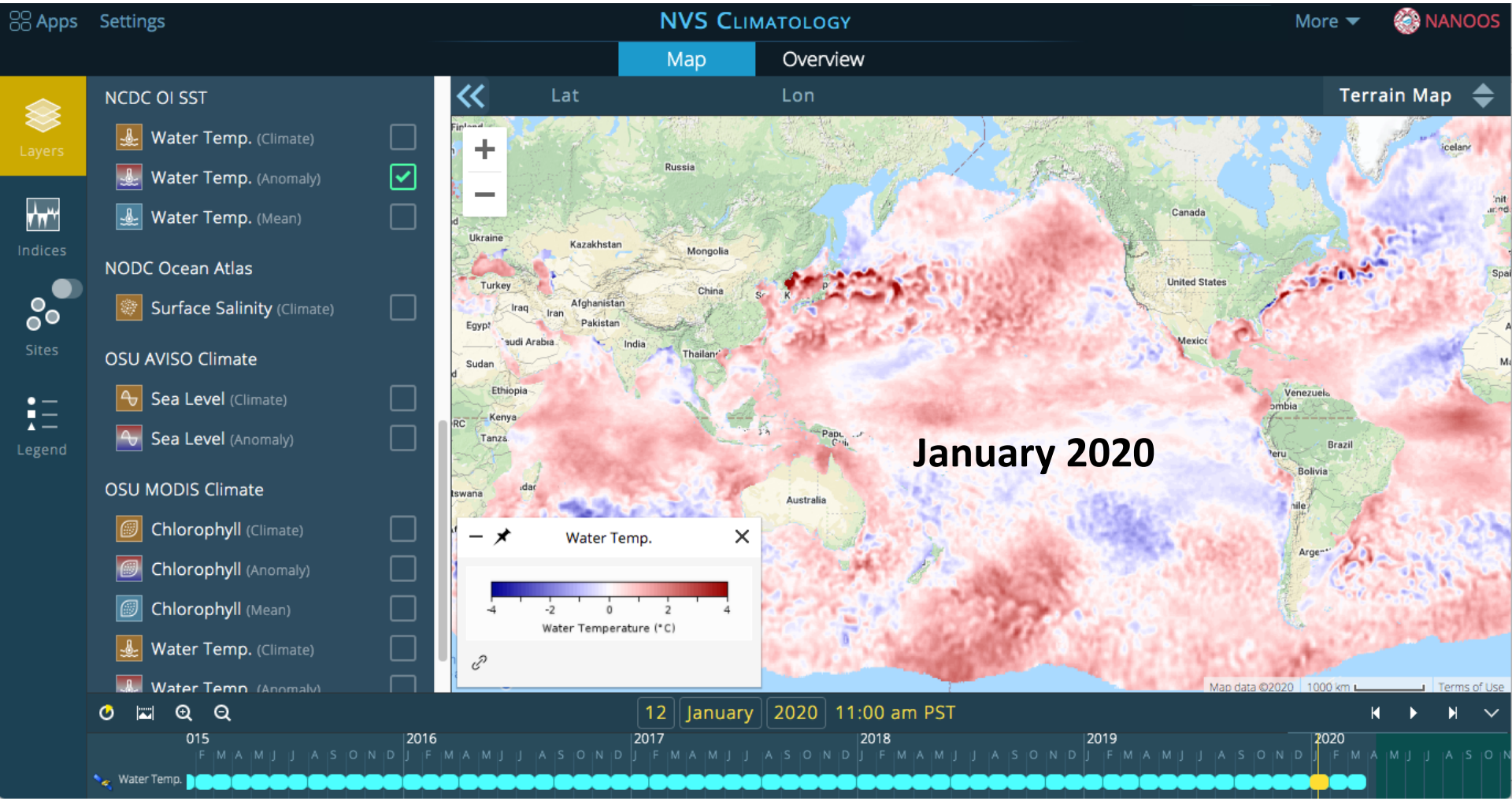

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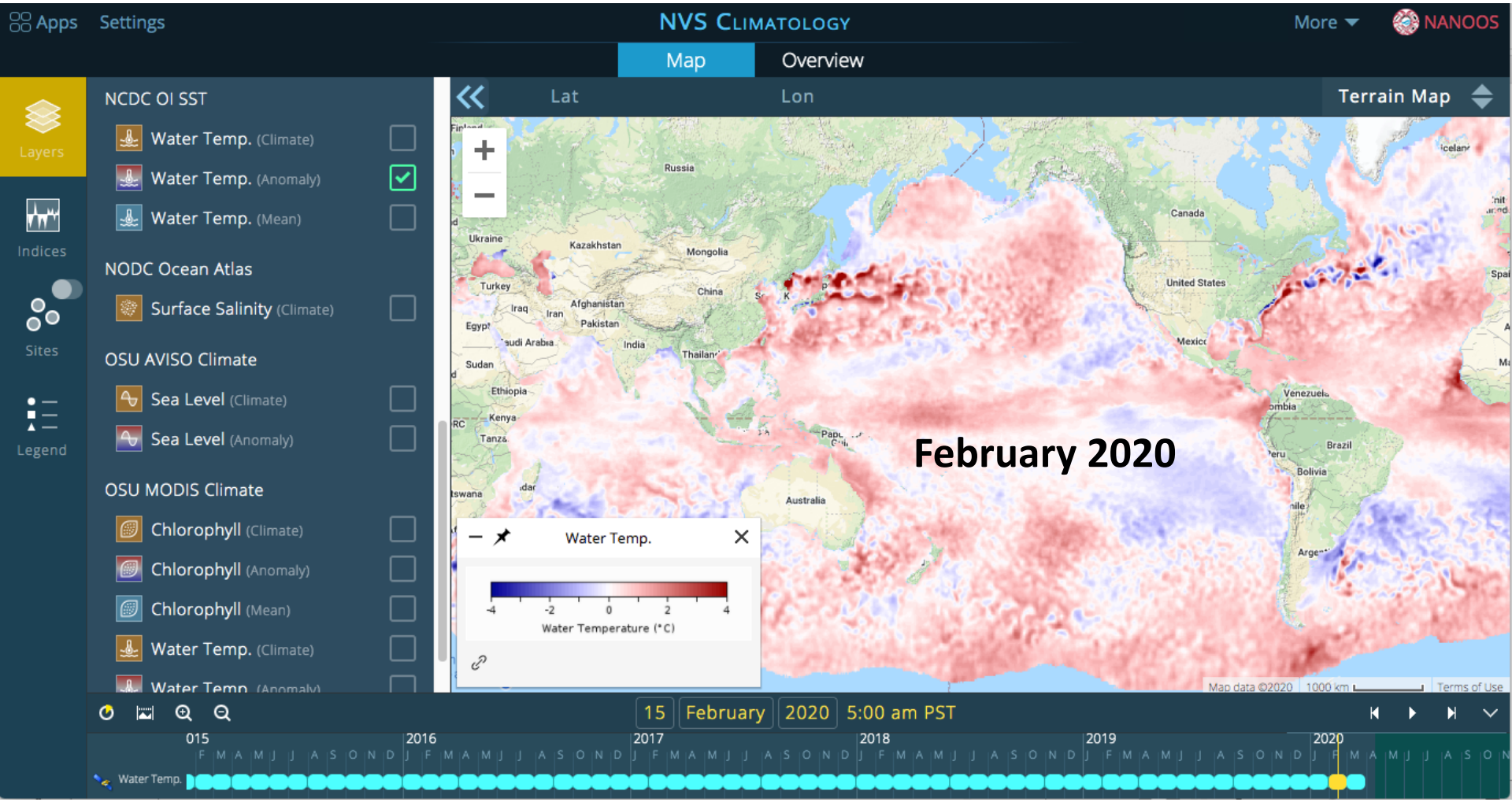

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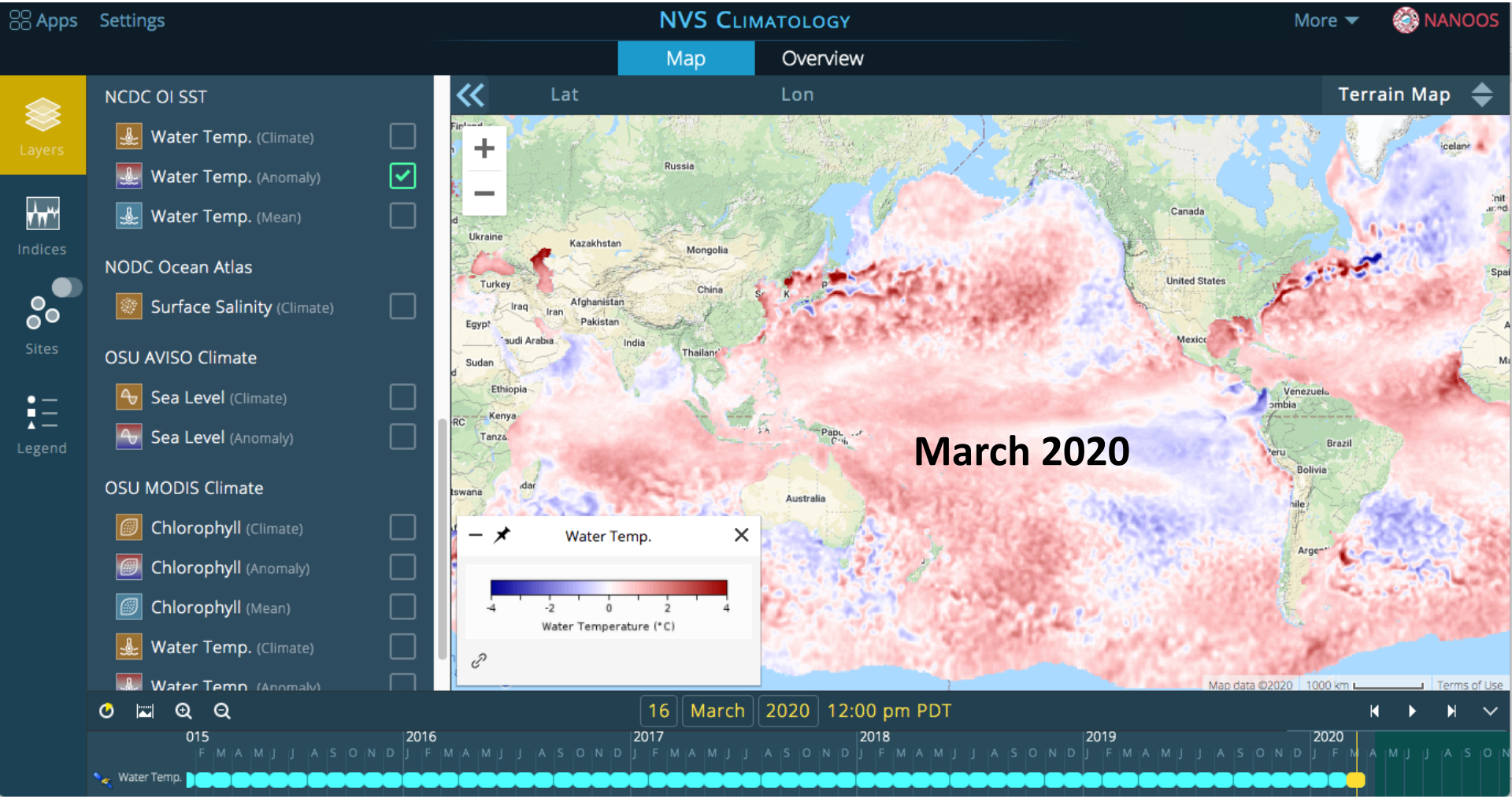
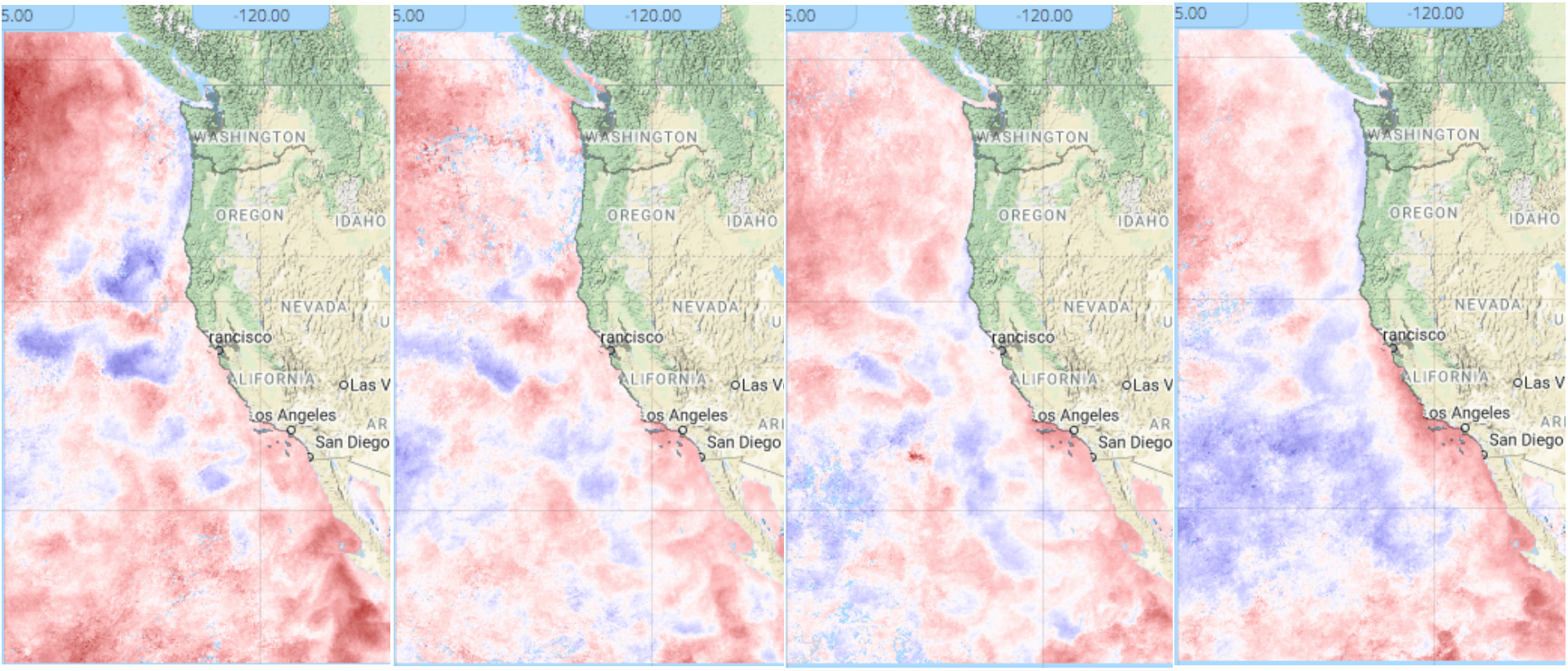


NANOOS: www.nanoos.org Climatology app

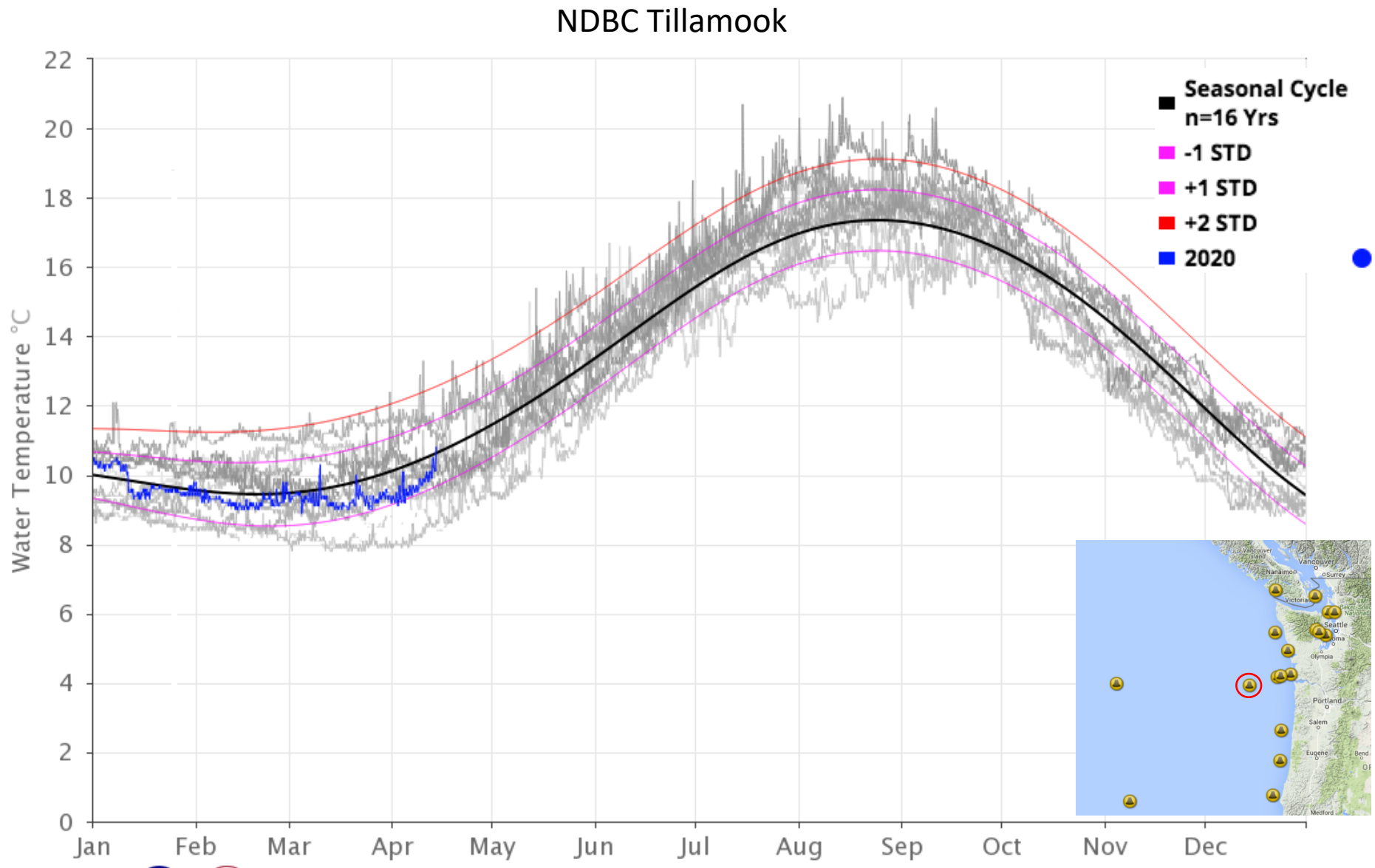
Sea Surface Temperature Anomaly
OSU Modis

December 2019 **January 2020** **February 2020** **March 2020**



NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature



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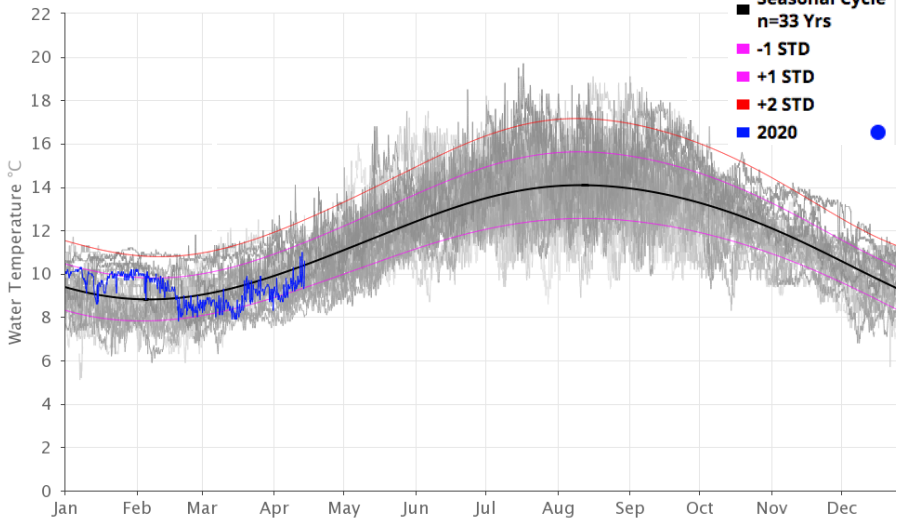
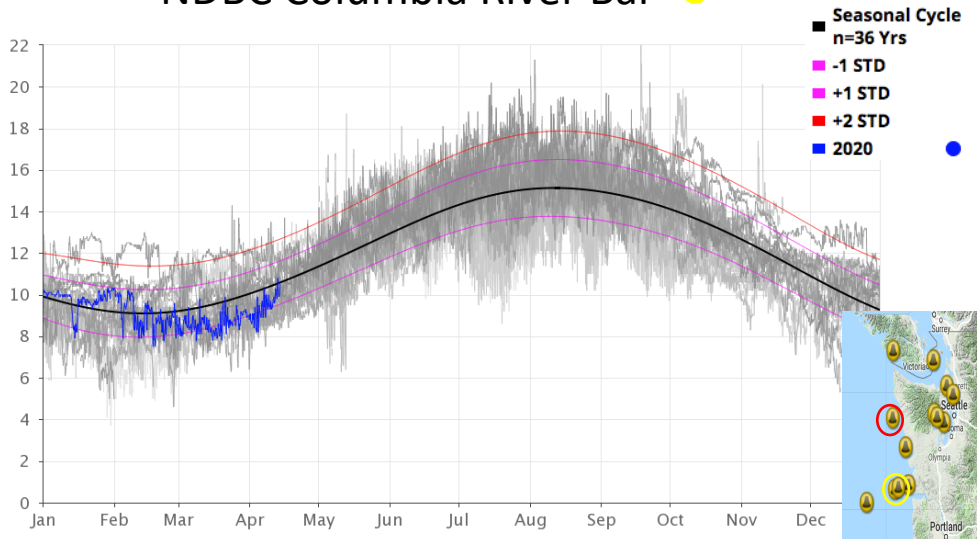
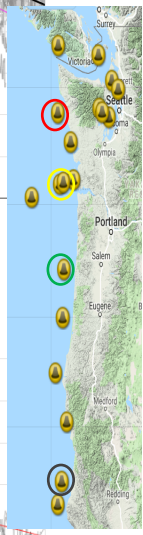
Sea Surface Temperature

NDBC Cape Elizabeth

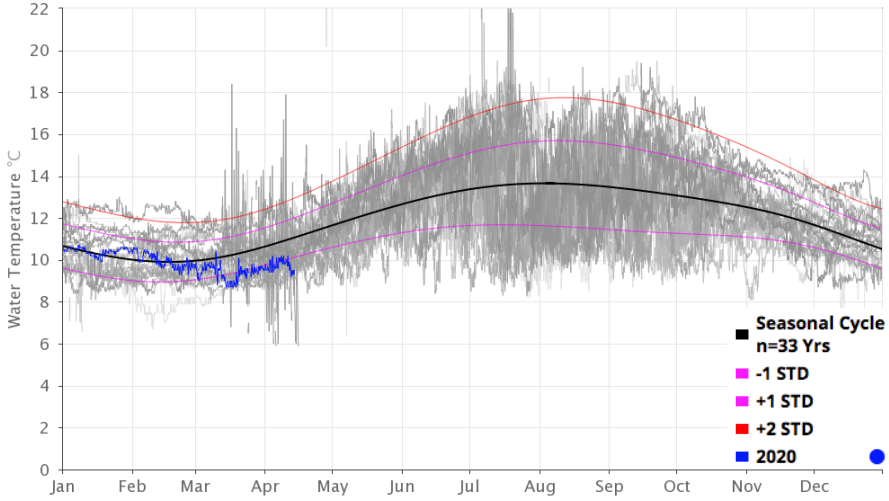


NDBC Columbia River Bar

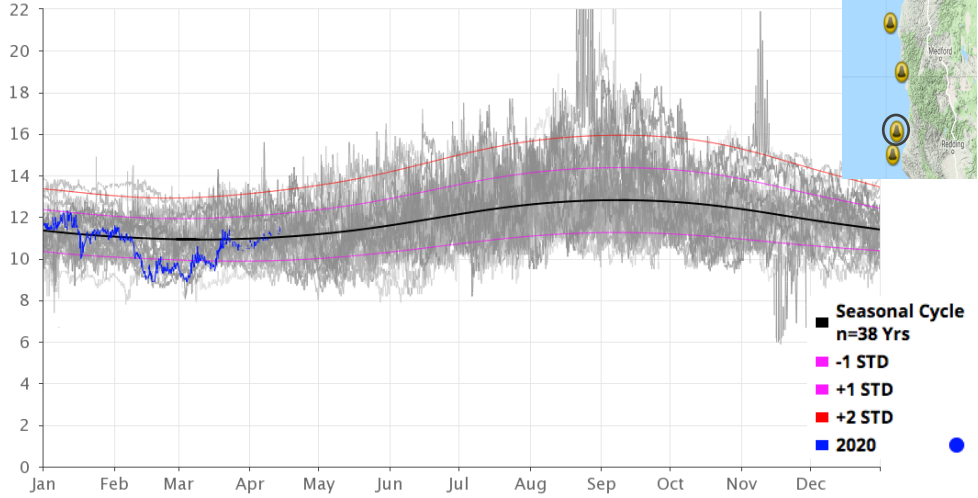




NDBC Stonewall Bank



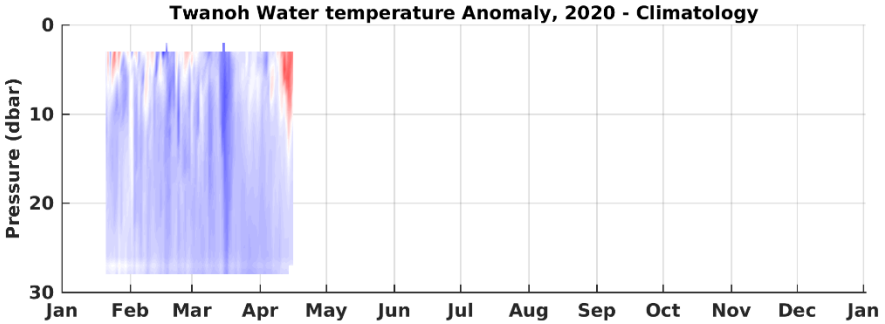
NDBC Eel River

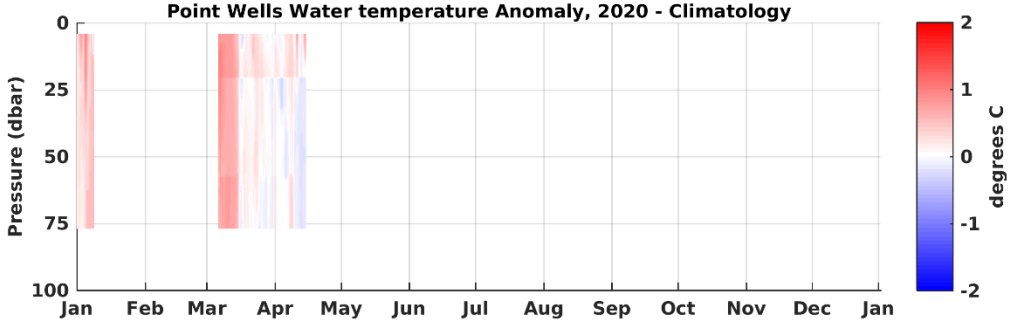


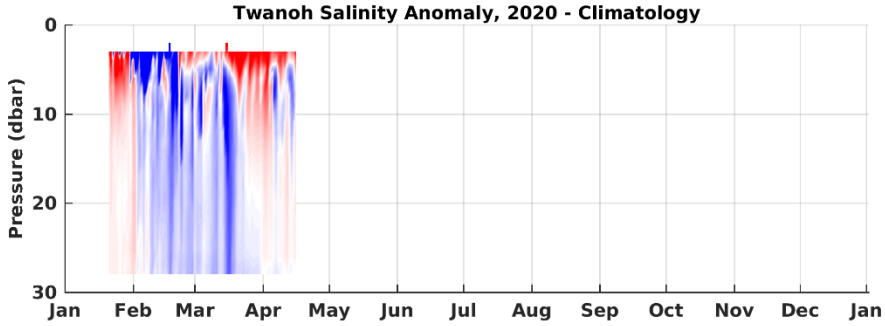
IOOS

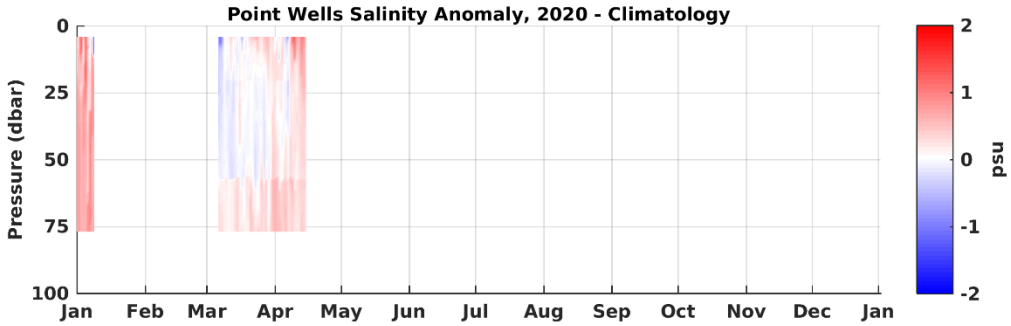
NANOOS: www.nanoos.org Climatology app

Puget Sound profiling buoys



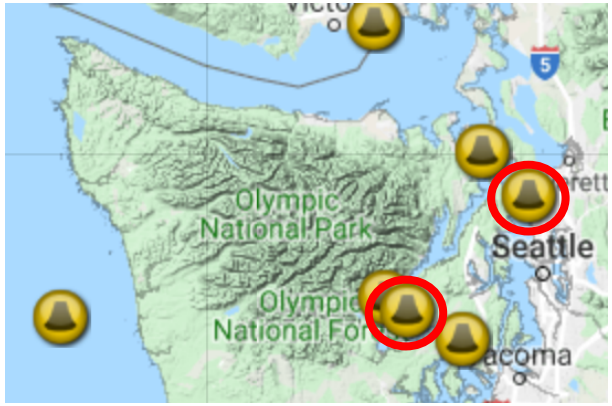


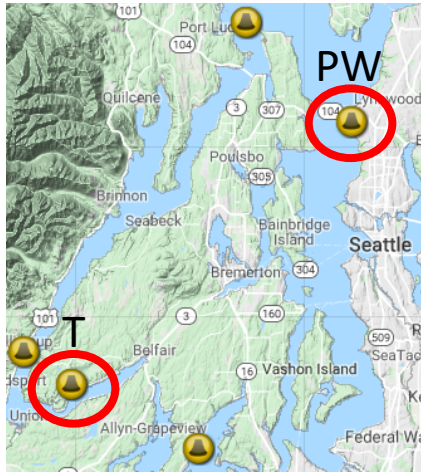




IOOS

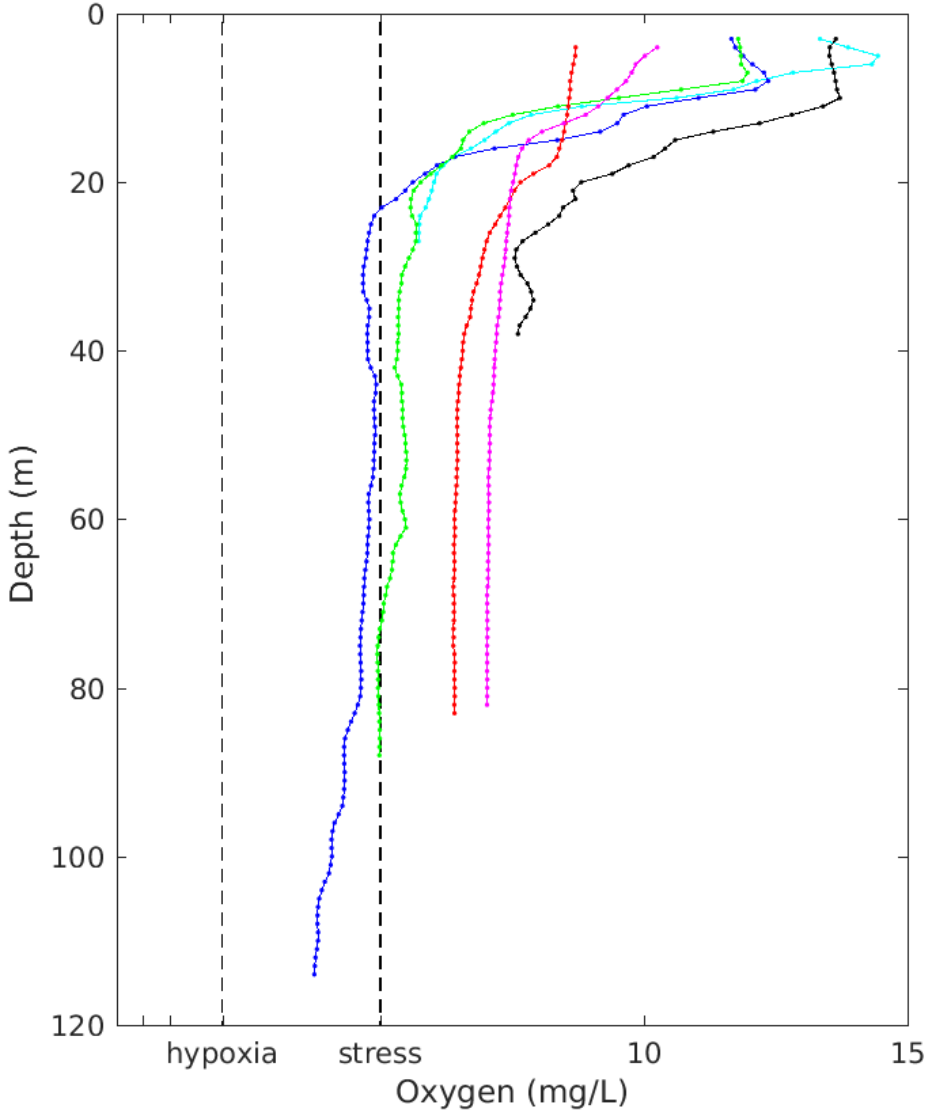
IOOS

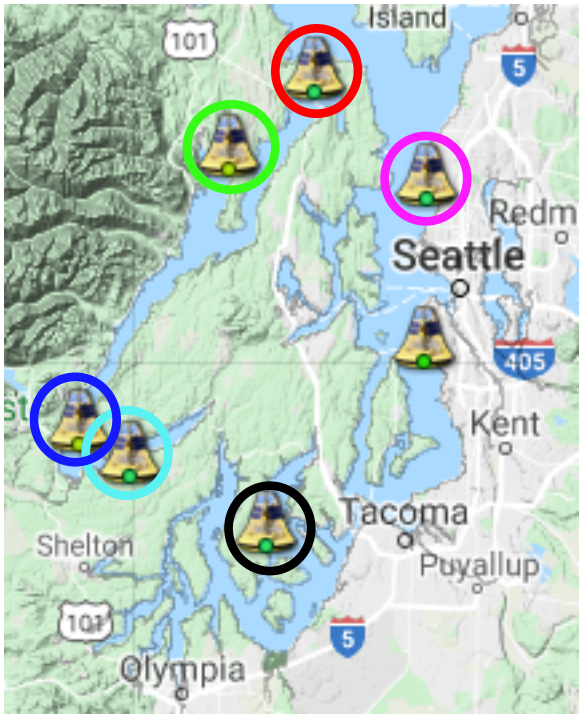




NANOOS: www.nanoos.org Climatology app

Puget Sound profiling buoys





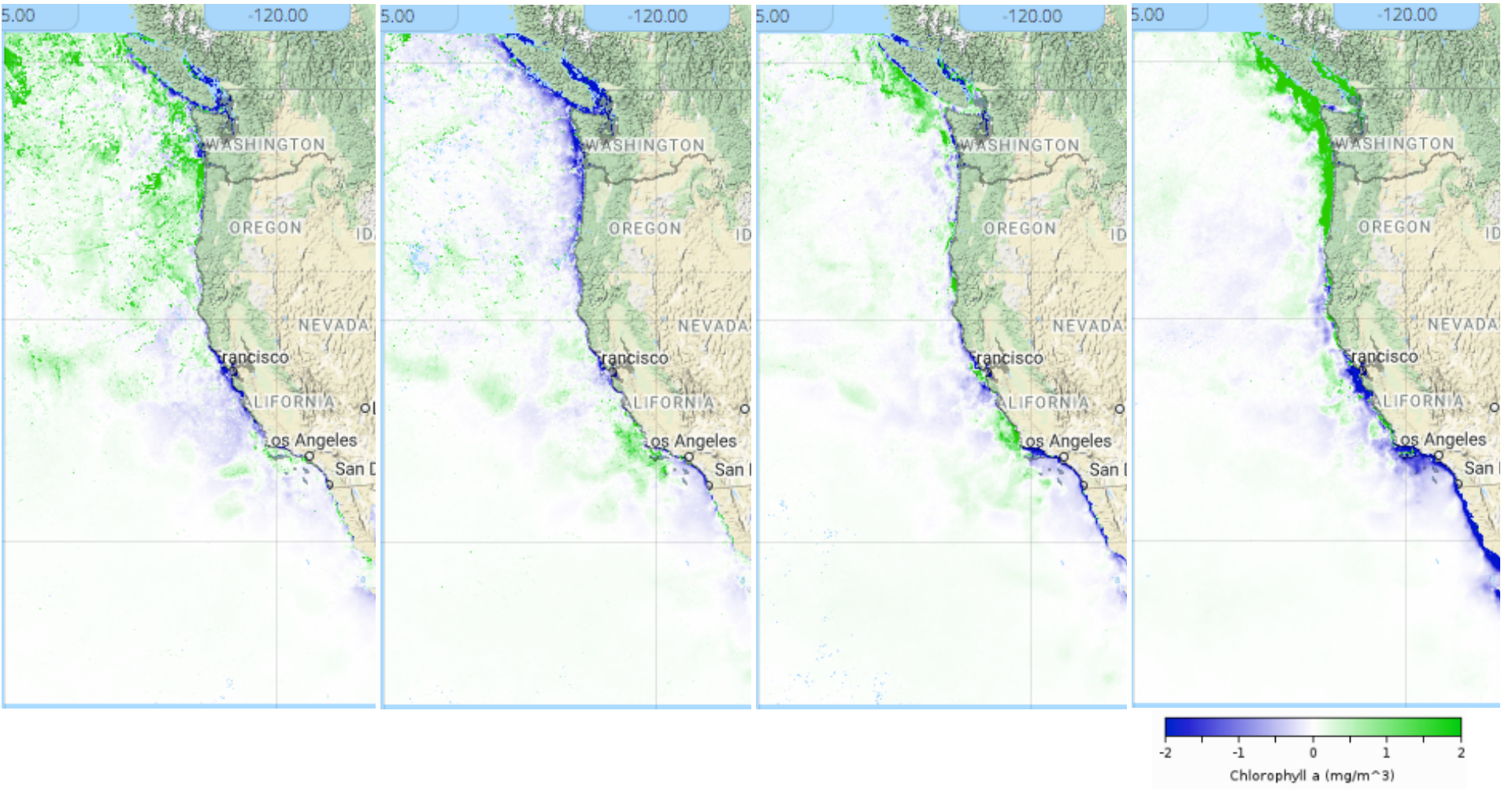
hypoxia (2 mg/L)
biological stress (5 mg/L)
Twanoh (South Hood Canal), 16-Apr-2020 12:11:55
Hoodsport (South Hood Canal), 16-Apr-2020 12:19:59
Dabob Bay (North Hood Canal), 16-Apr-2020 12:19:23
Hansville (near Admiralty Inlet), 16-Apr-2020 00:20:25
Carr Inlet (South Sound), 16-Apr-2020 12:16:35
Point Wells (Main Basin), 15-Apr-2020 12:16:53

IOOS

NANOOS: www.nanoos.org Climatology app

Chlorophyll Anomaly
OSU Modis

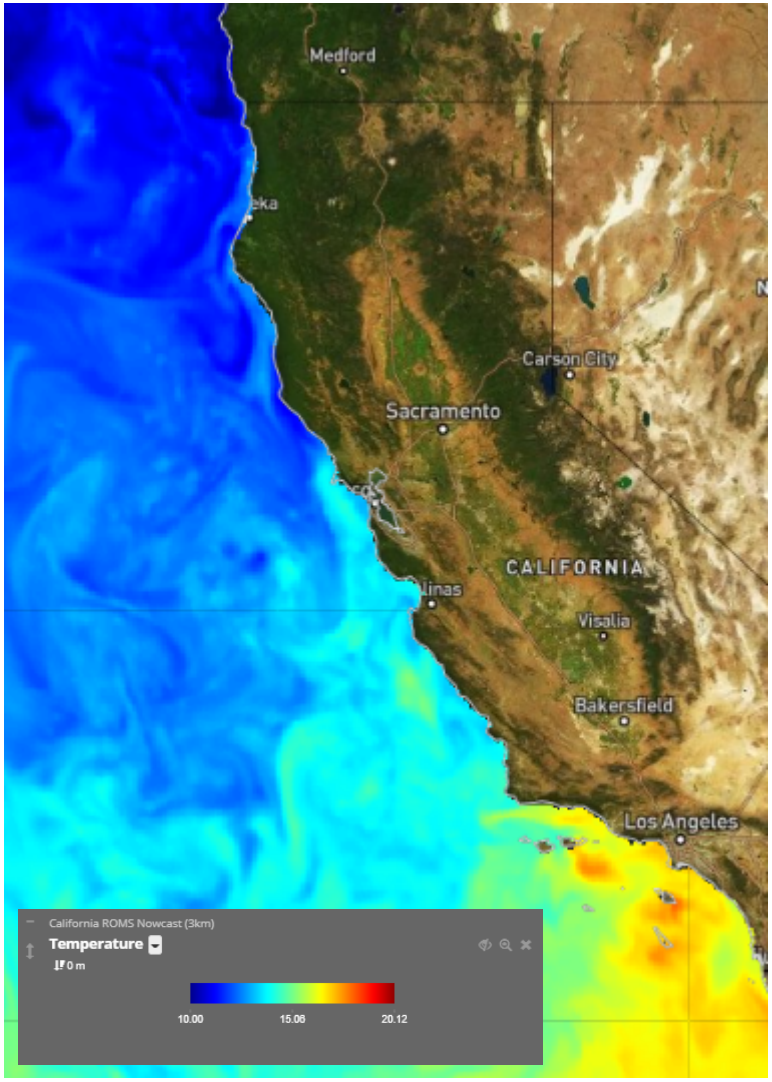
December 2019 **January 2020** **February 2020** **March 2020**

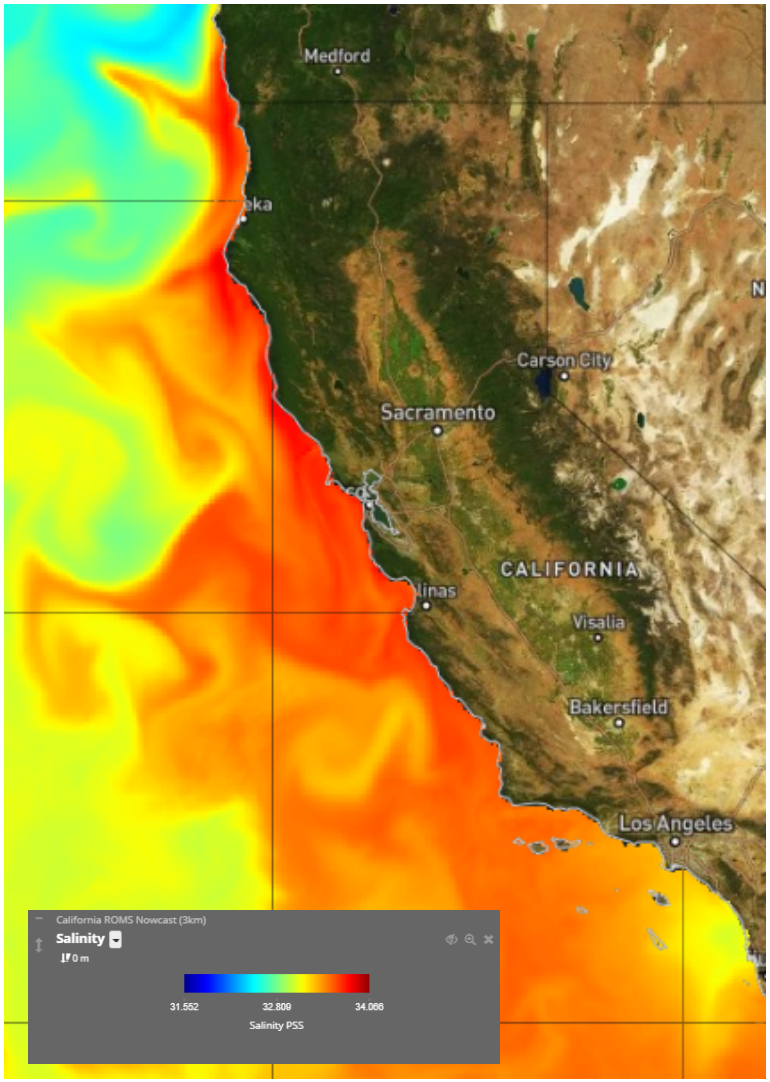


CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

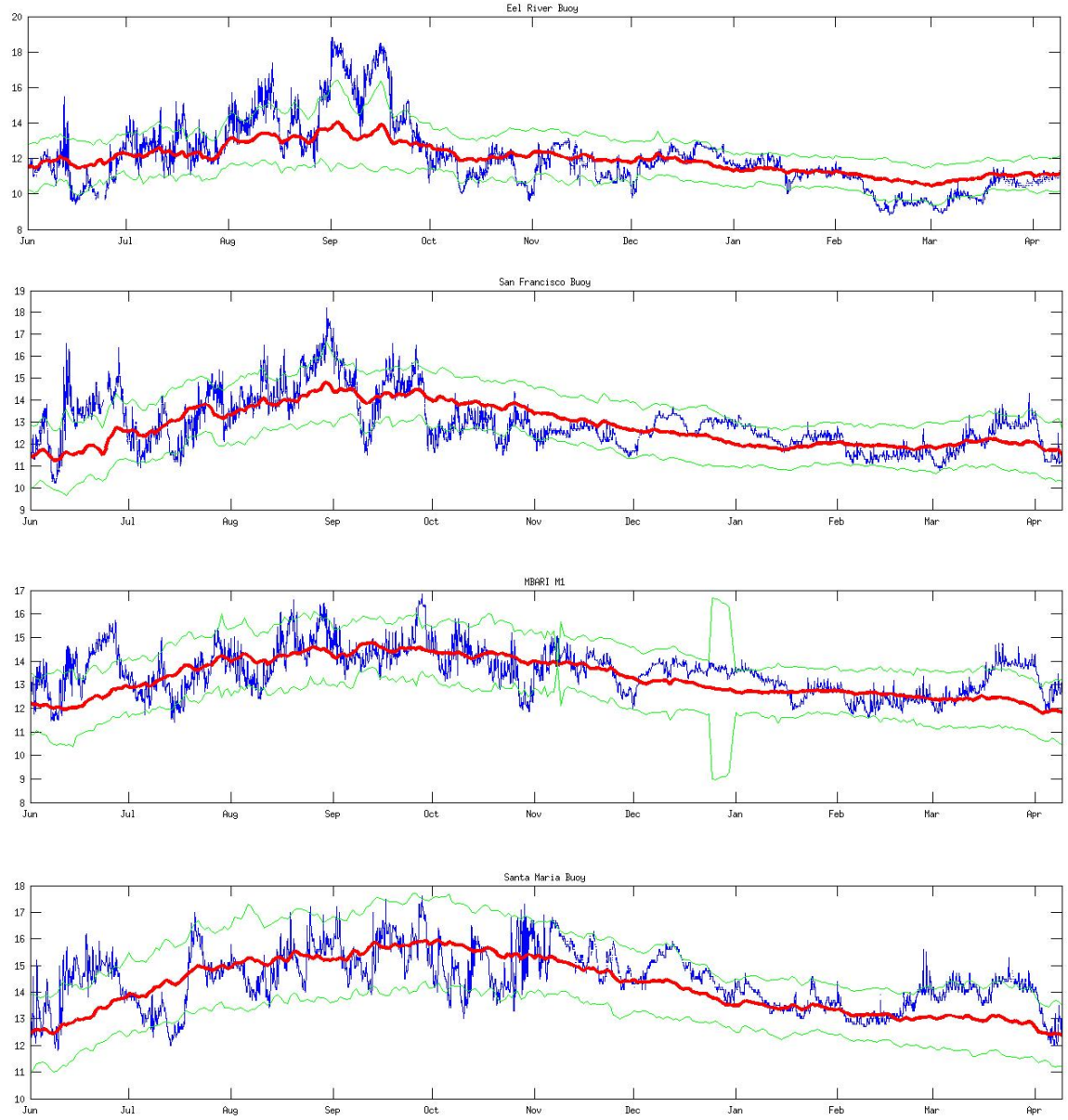
NOAA West Watch Update

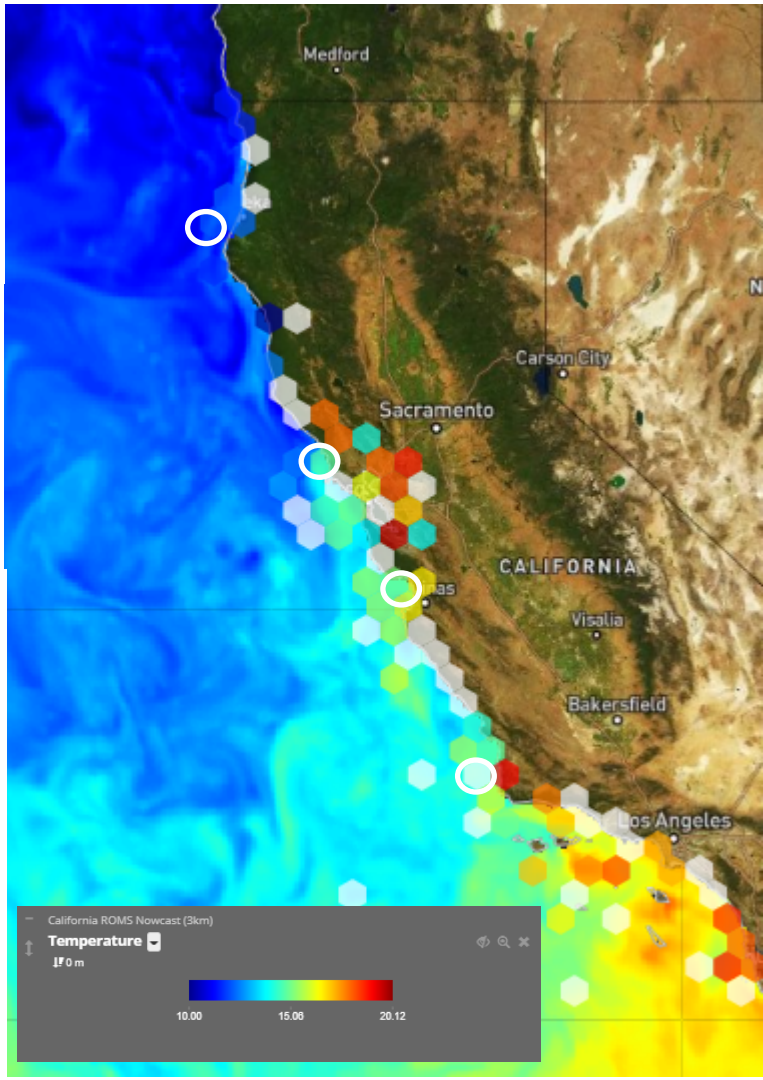
April 2020





Sea Surface Temp: Moorings

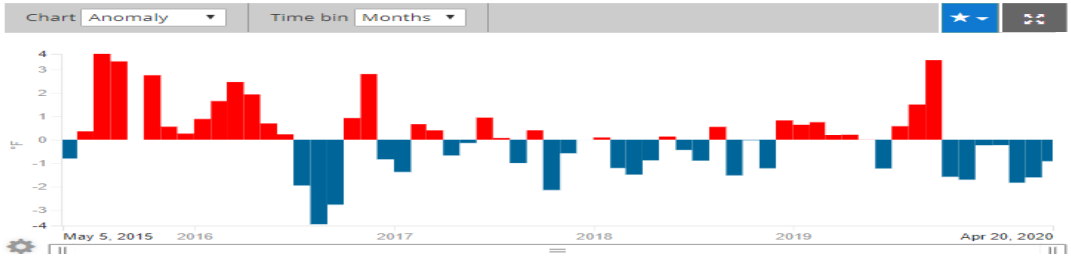




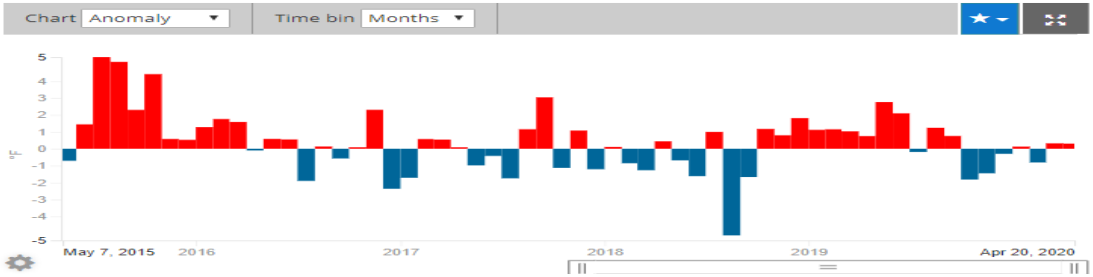
CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Temp Anomaly: Moorings

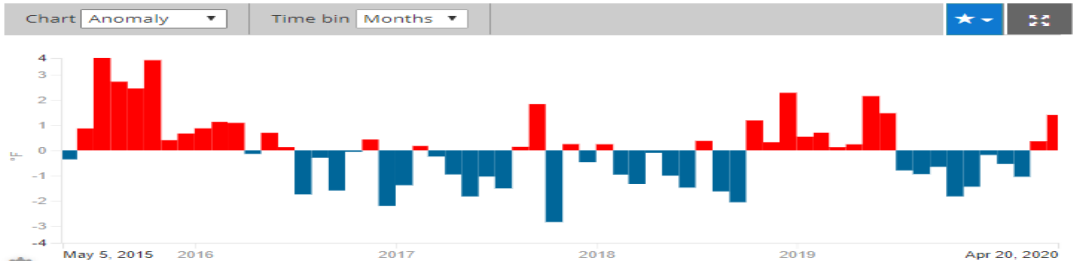
46022 - EEL RIVER - 17NM WSW of Eureka, CA



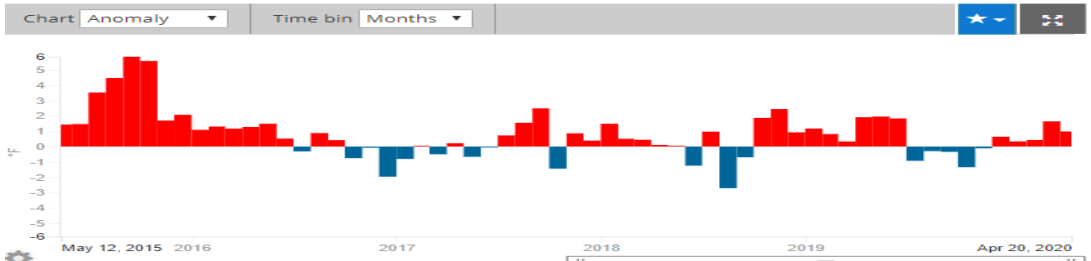
San Francisco - 18 NM West of San Francisco, CA (46026)

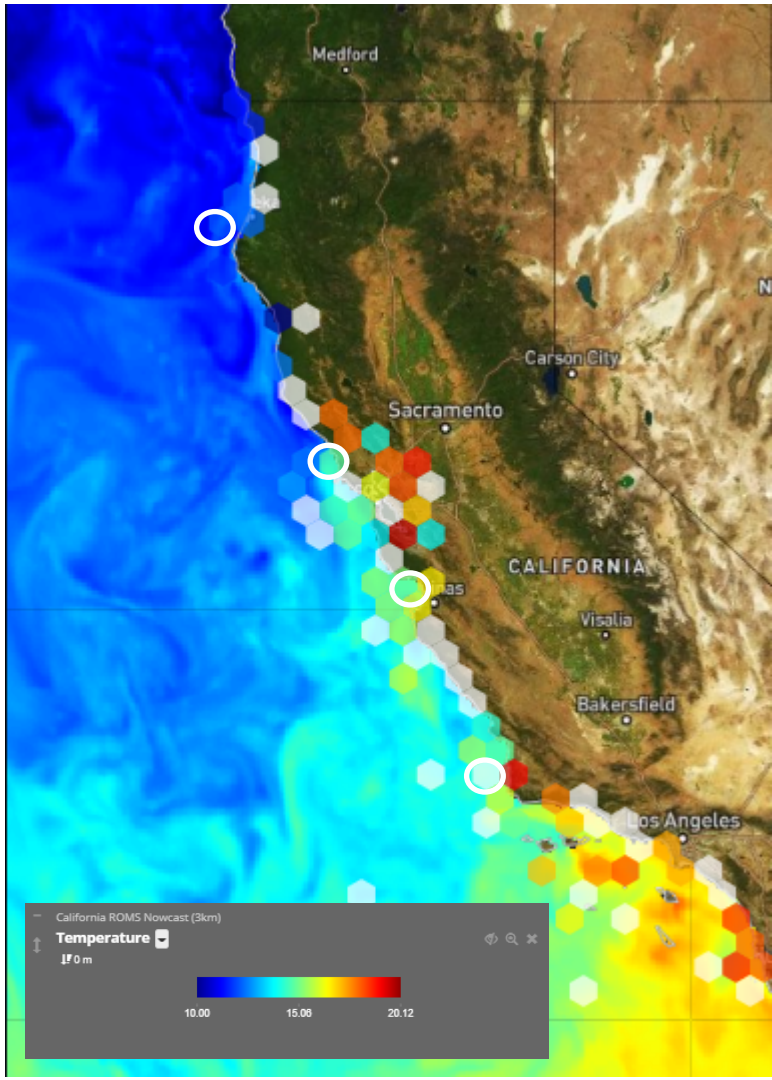


M1 MBARI



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

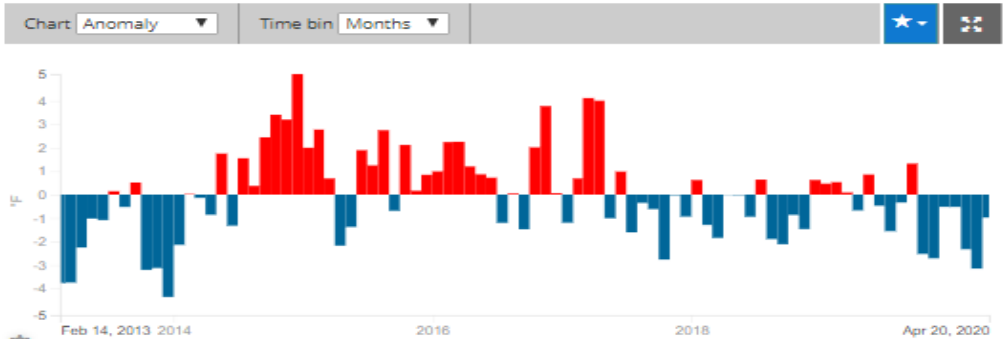




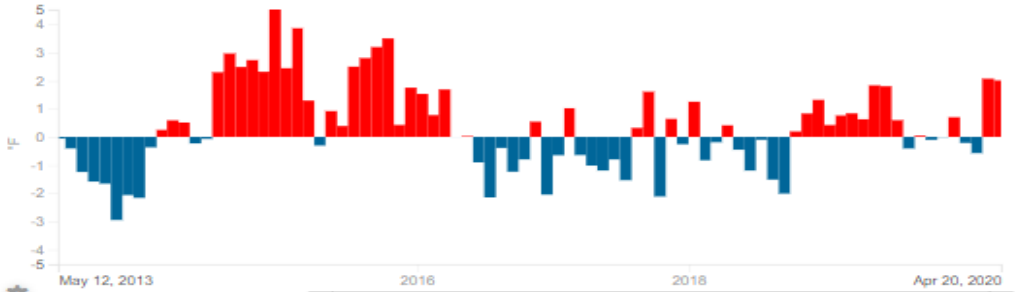
CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Temp Anomaly: Shore Stations

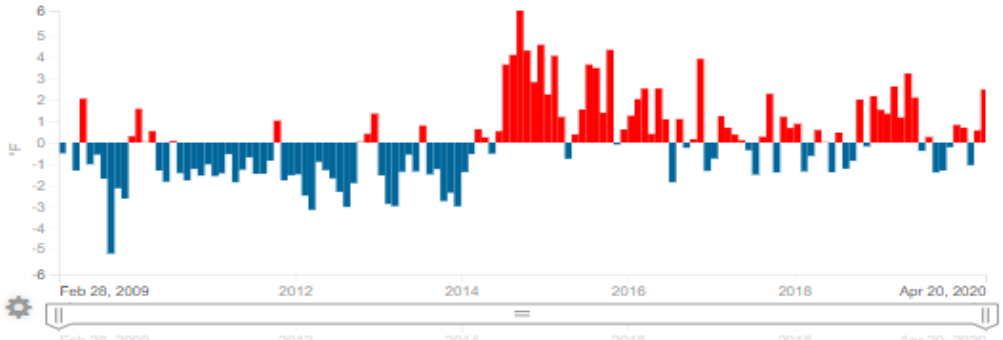
HSU Trinidad Station

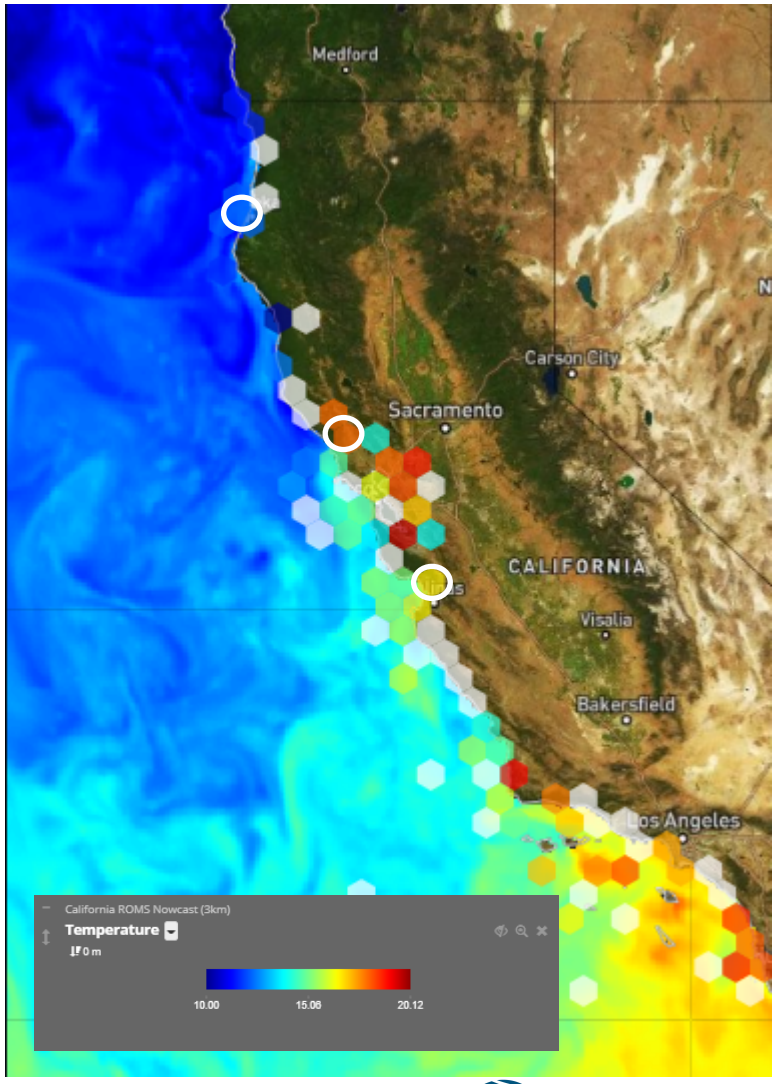


Bodega Bay (BML_WTS)



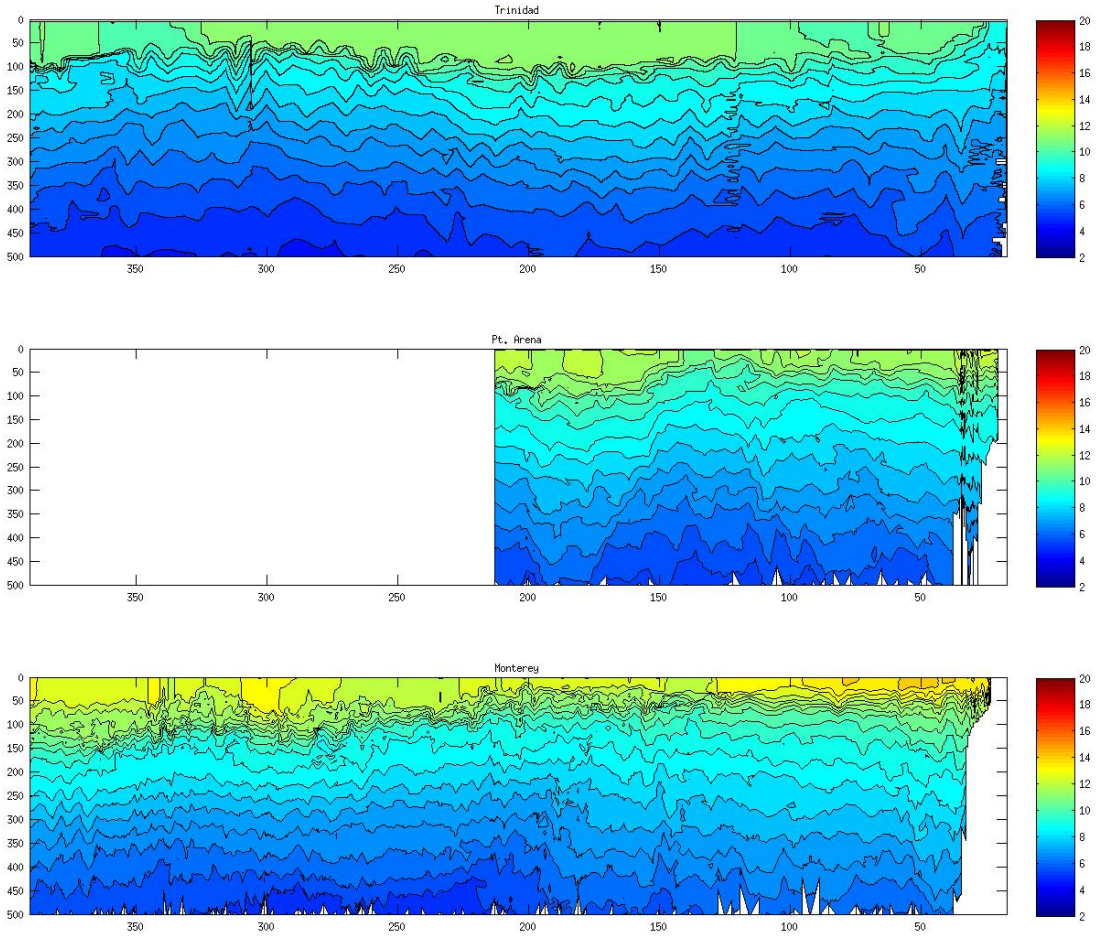
Moss Landing Marine Laboratories Seawater Intake

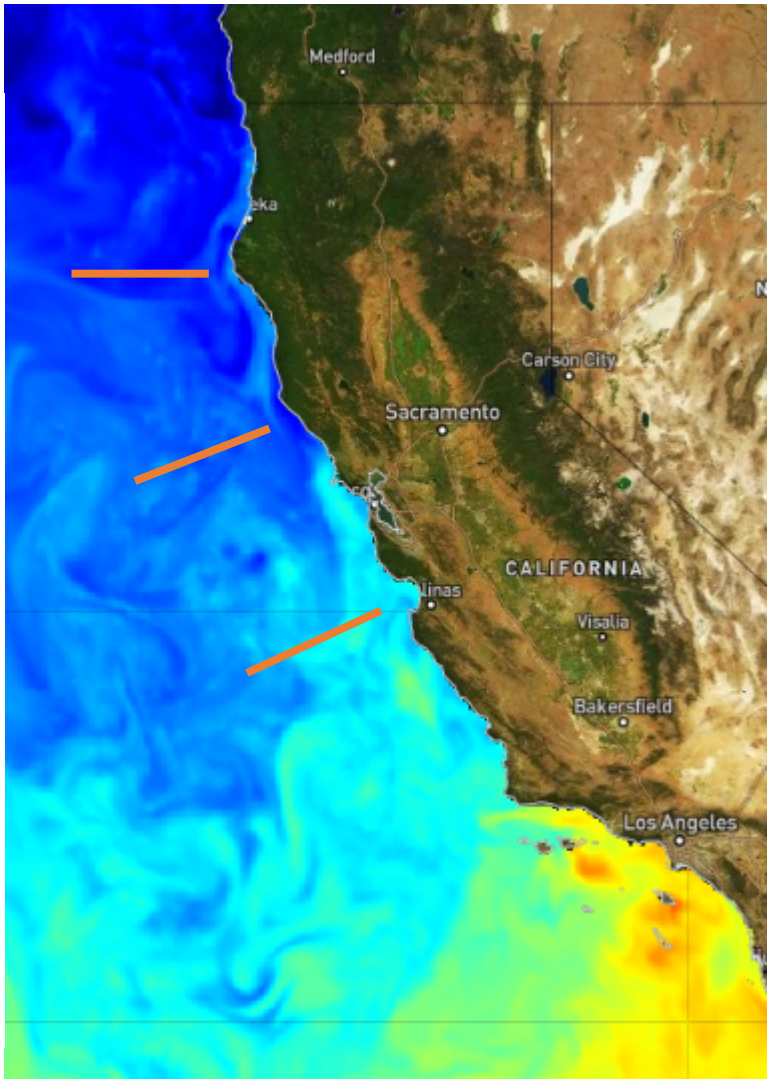




CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Offshore Temp: Gliders

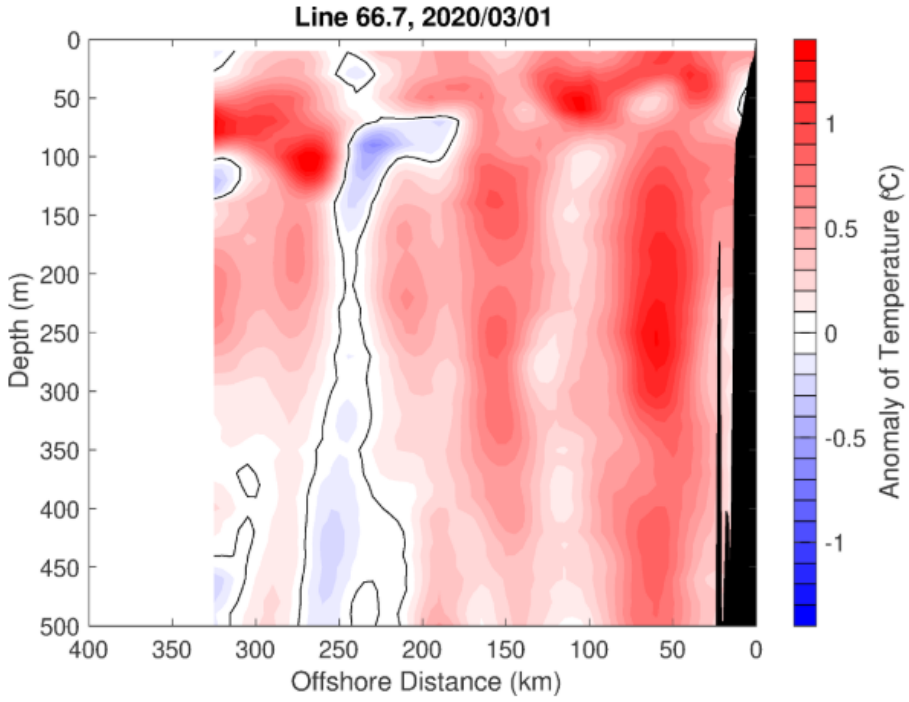




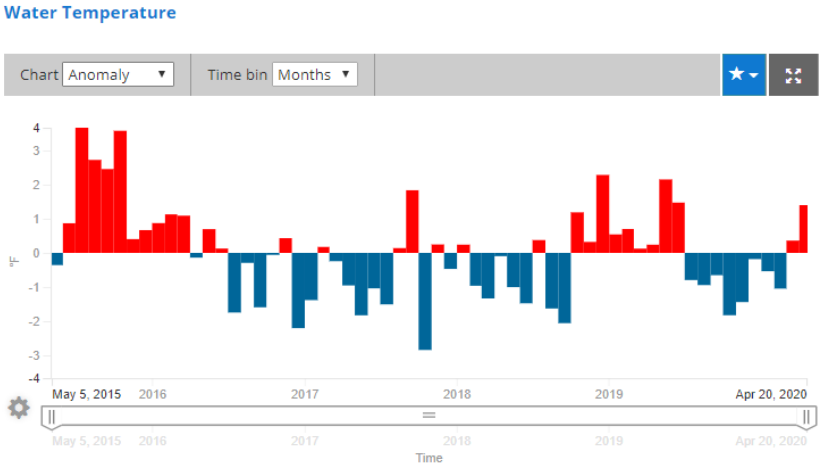
CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

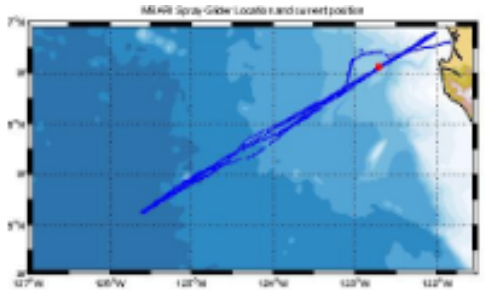
Temp Anomaly - Monterey Bay Region

Glider line 67.7



M1 mooring





CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

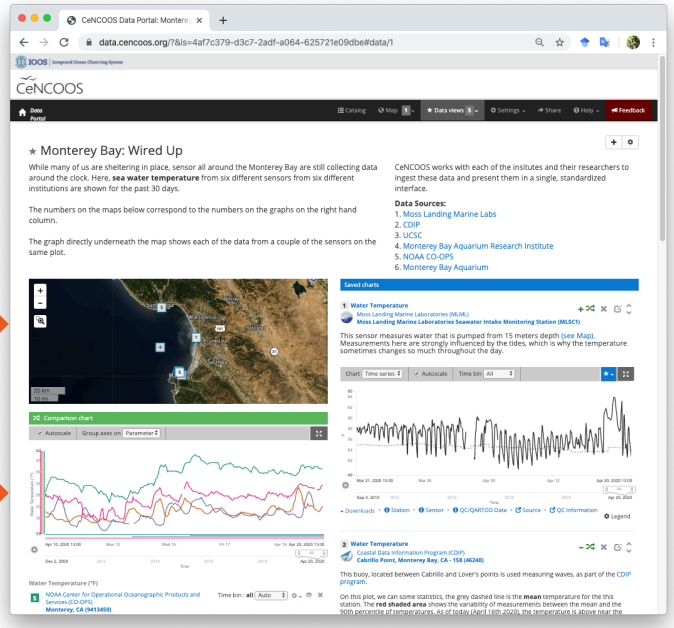
Monterey Bay: Wired Up

Curated Dataview Feature

While many of us are sheltering in place sensors all around the Monterey Bay are still collecting data around the clock. Here, **sea water temperature** from six different sensors from six different institutions are shown for the past 30 days.

The numbers on the maps below correspond to the numbers on the graphs on the right hand column.

The graph directly underneath the map shows each of the data from a couple of the sensors on the same plot.



CeNCOOS works with each of the data providers to ingest these data and present them in a single, standardized interface.

Data Sources:

1. Moss Landing Marine Labs
2. CDIP
3. UCSC
4. Monterey Bay Aquarium Research Institute
5. NOAA CO-OPS
6. Monterey Bay Aquarium

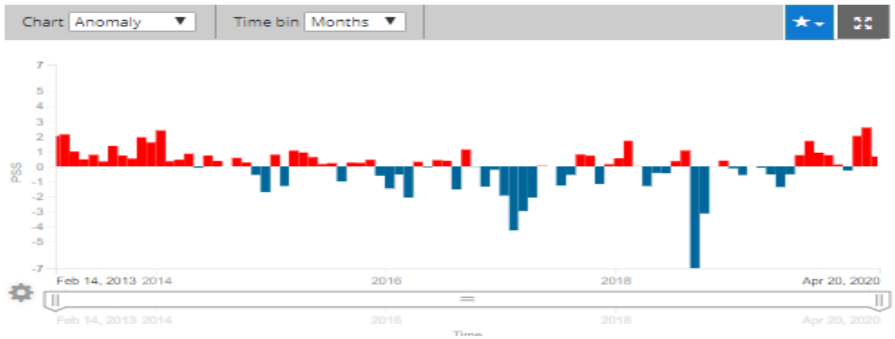
Visit the CeNCOOS Portal & explore!

https://data.cencoos.org/?&ls=4af7c379-d3c7-2adf-a064-625721e09dbe#data/1

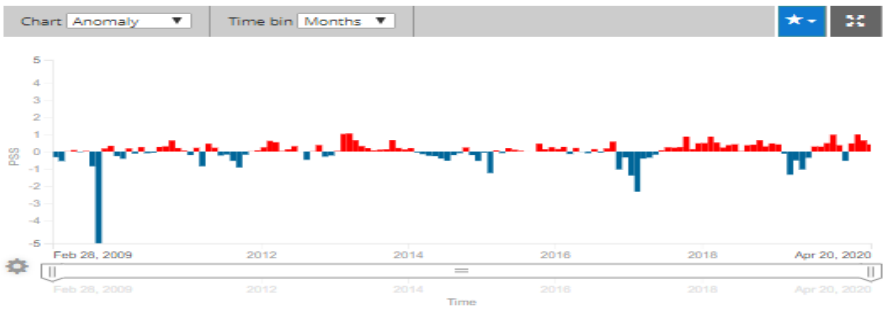
CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Salinity Anomaly: Shore Stations

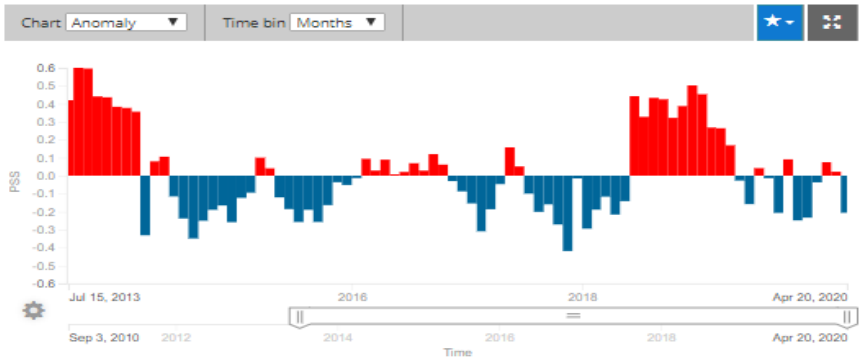
HSU Trinidad Station

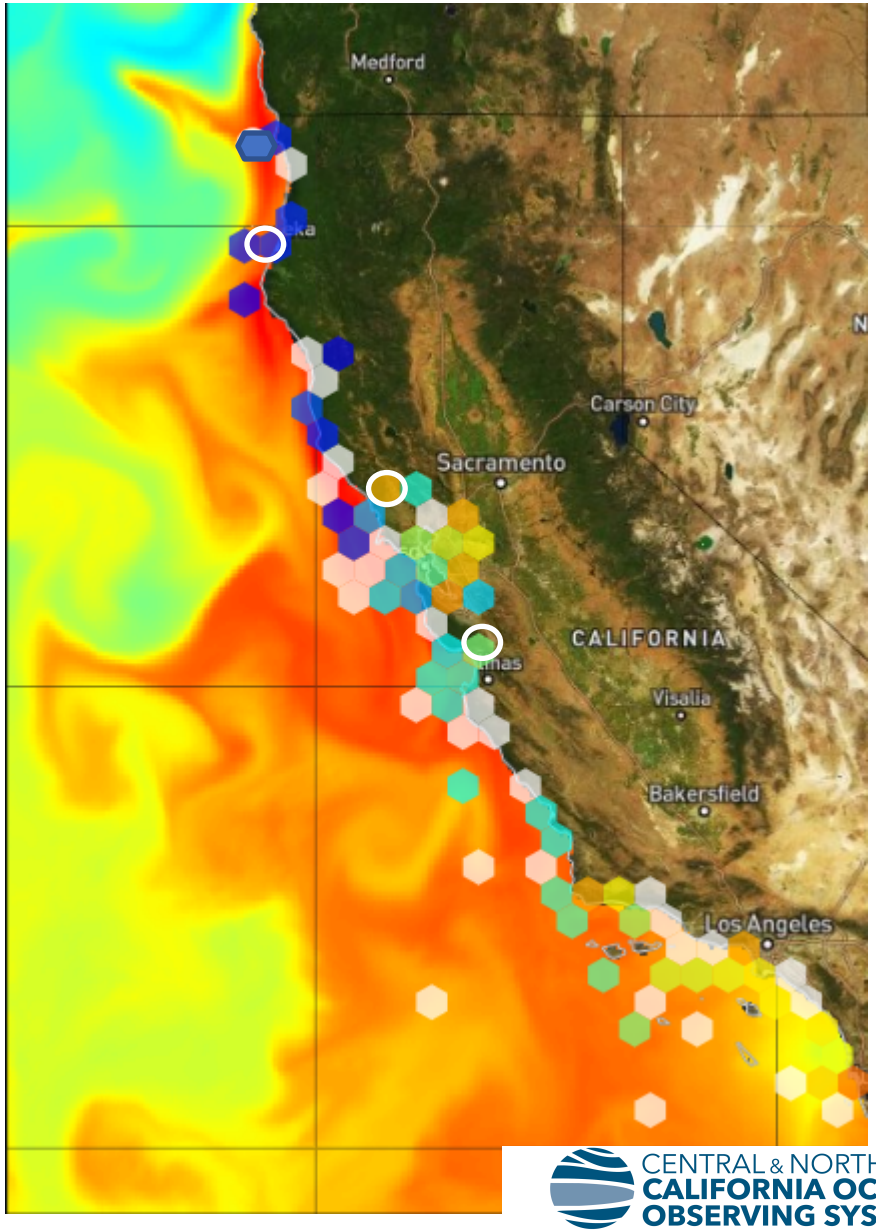


Bodega Bay (BML_WTS)



Moss Landing Marine Laboratories Seawater Intake

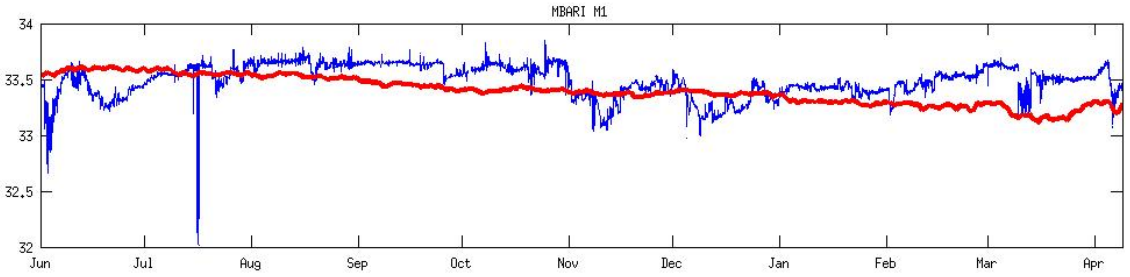


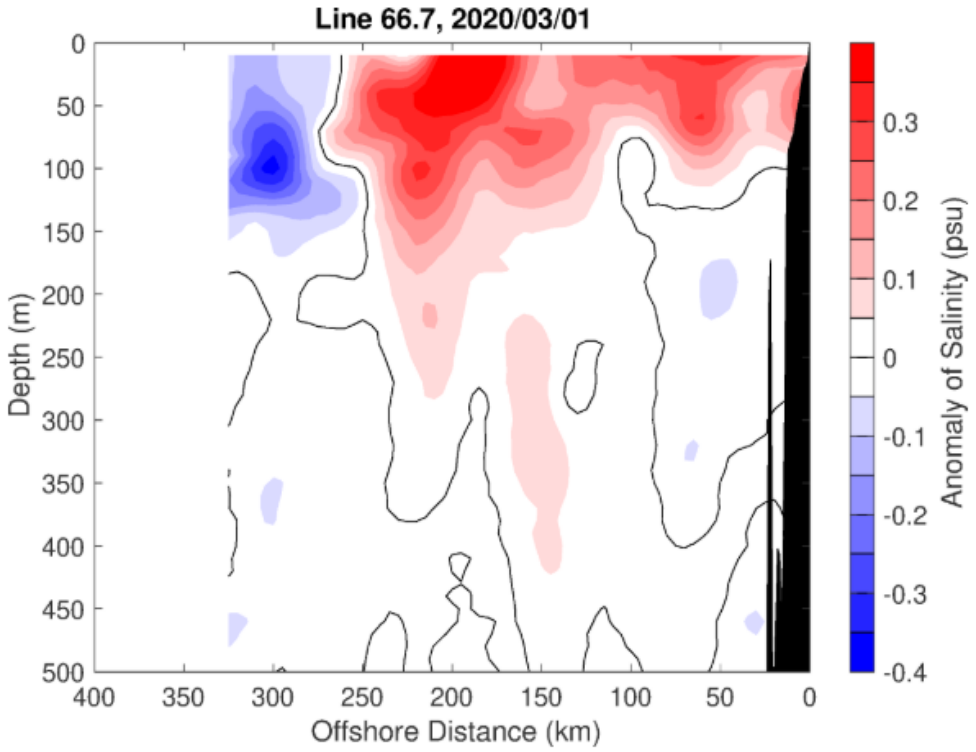


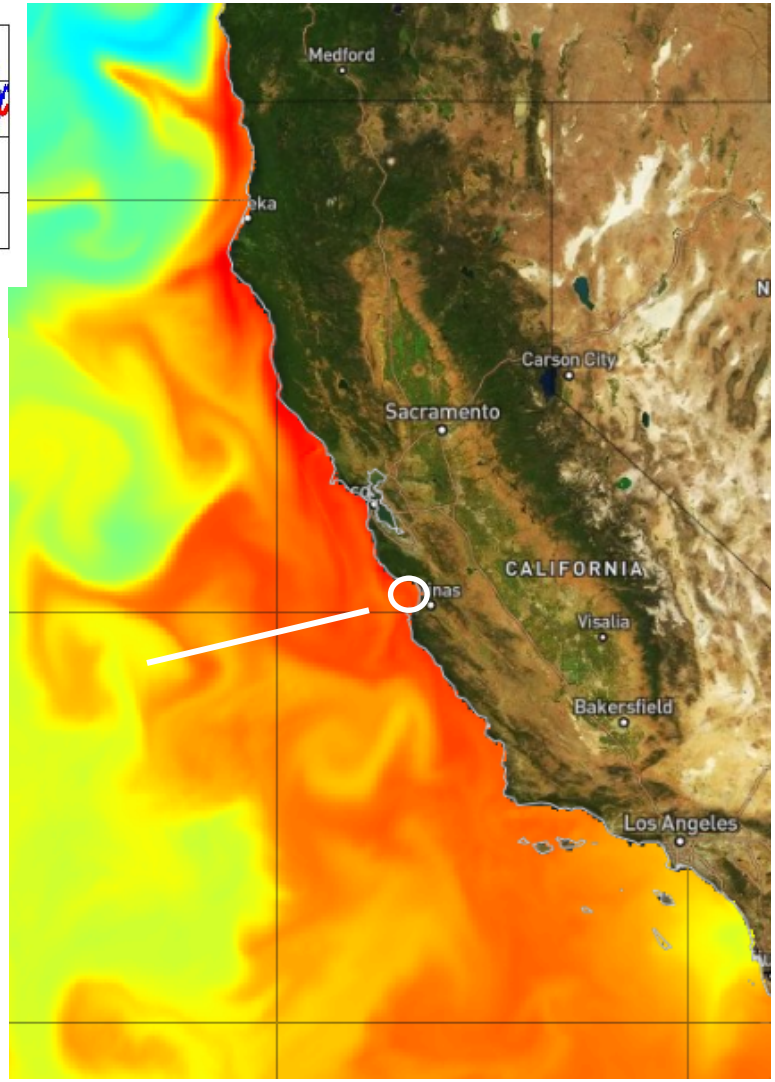
CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Salinity M1 and Line 67

CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

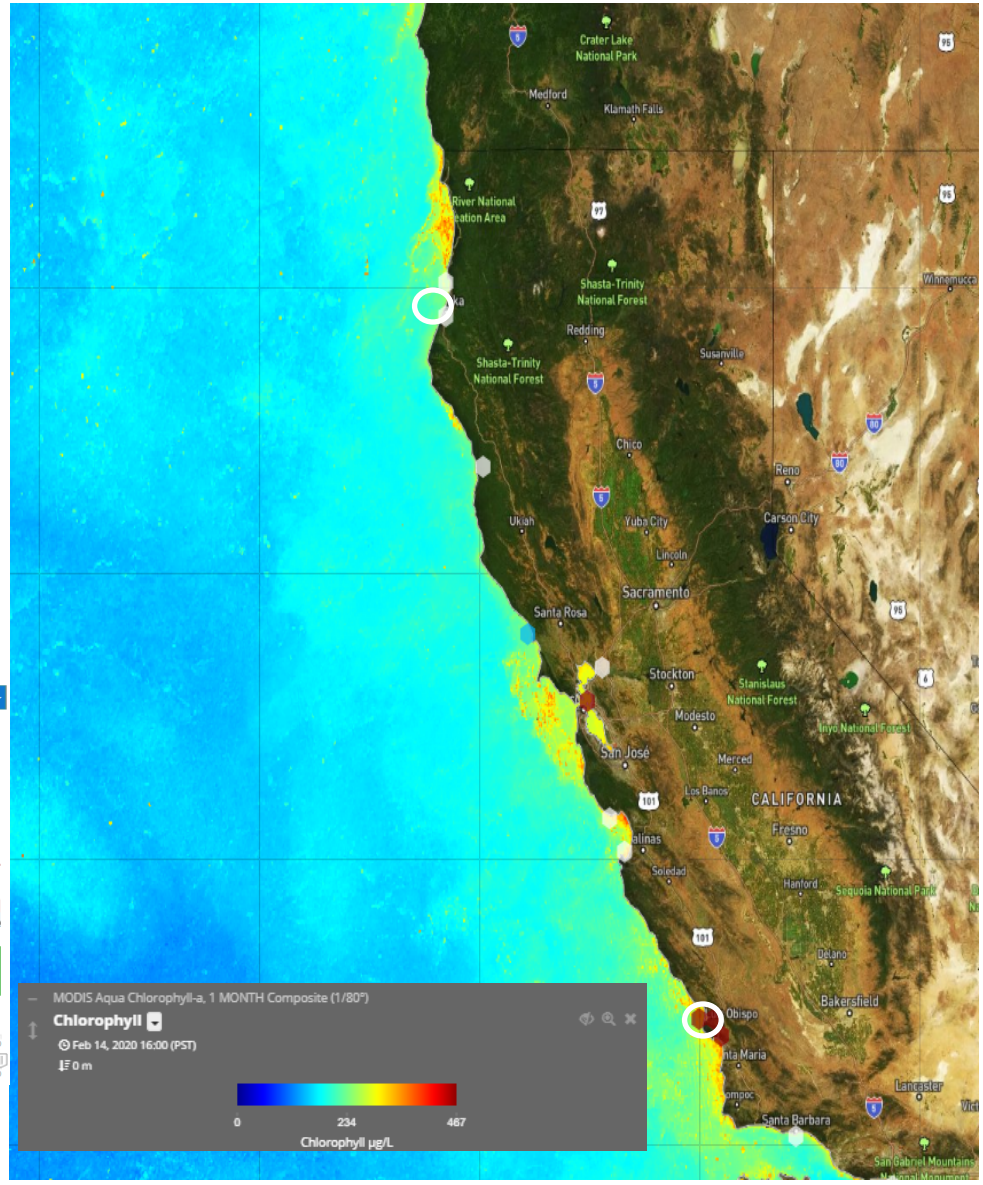






CeNCOOS Chlorophyll

CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM



CENTRAL & NORTHERN
CALIFORNIA OCEAN
OBSERVING SYSTEM

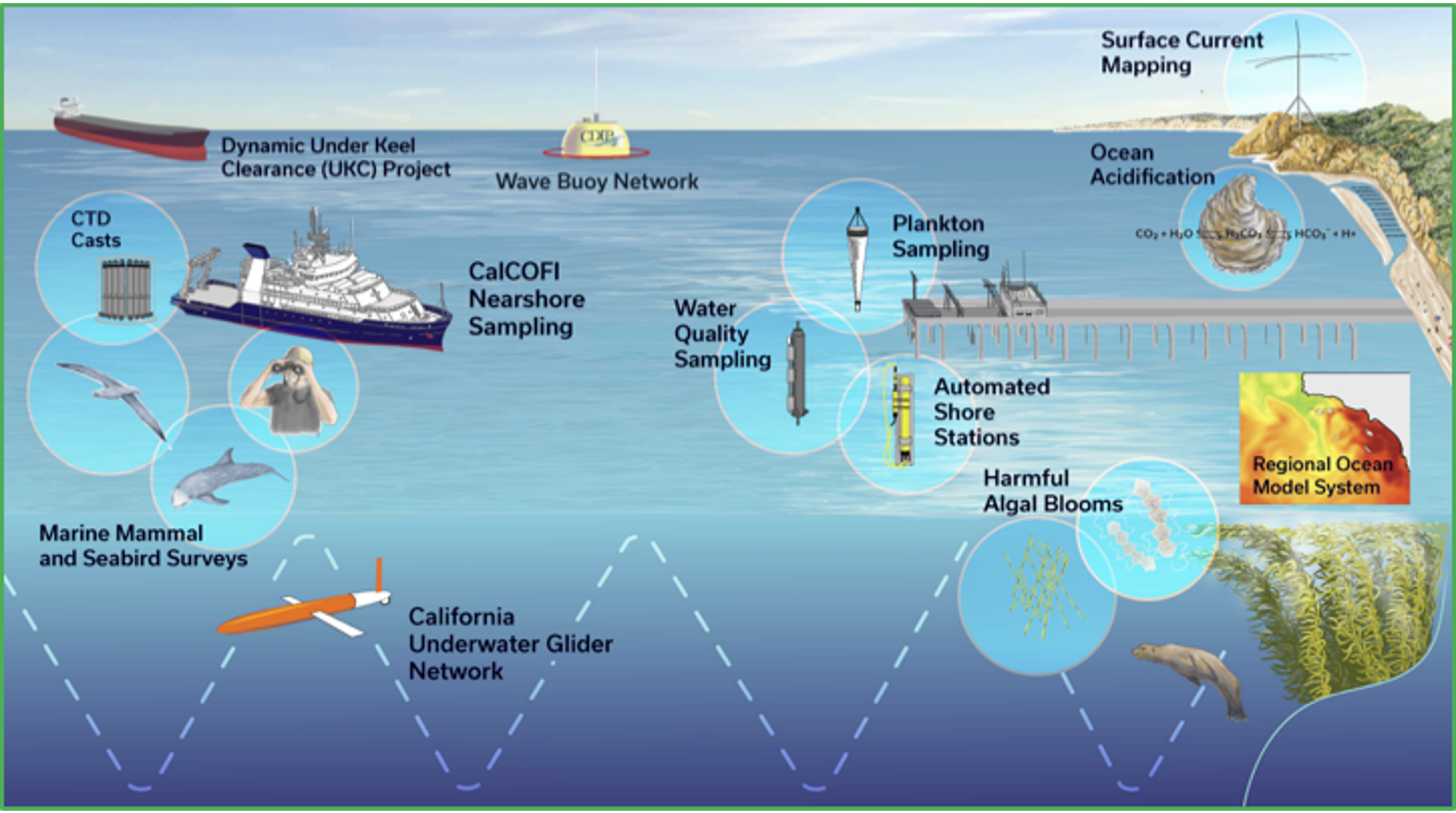
Thank you!

aharper@mbari.org

NOAA West Watch Update

April 2020

SOUTHERN CALIFORNIA
COASTAL OCEAN
OBSERVING SYSTEM



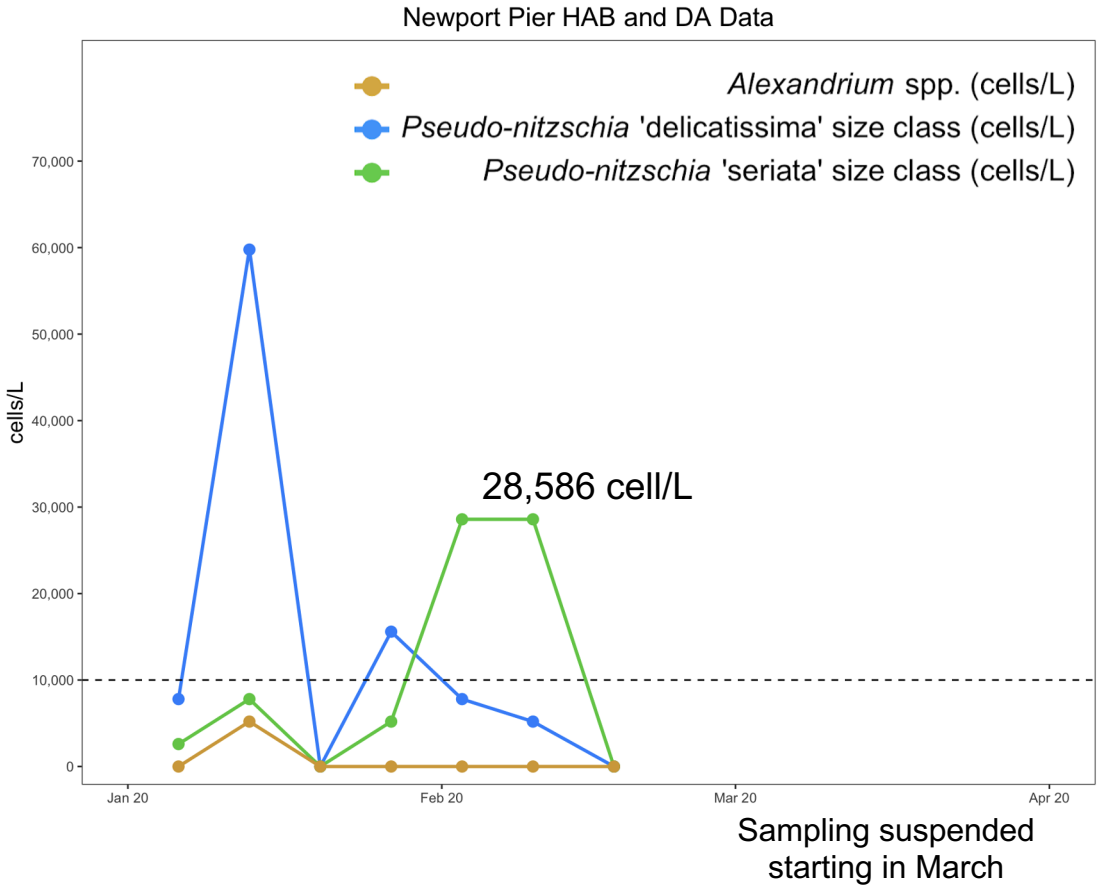
NOAA West Watch Update: Southern California

Clarissa Anderson and Megan Medina

21-April 2020

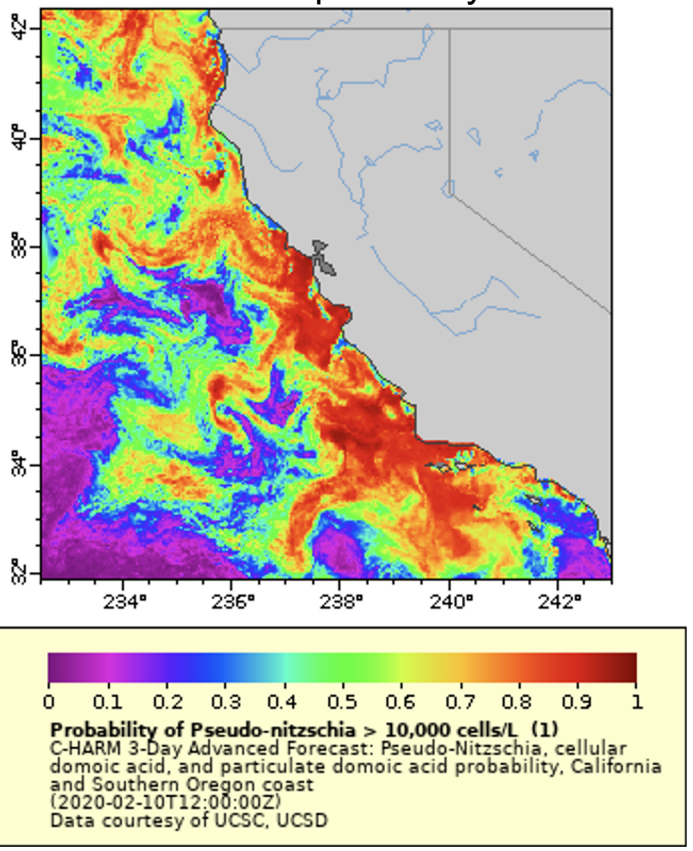
Jan-Mar 2020 HABMAP Data

Potentially toxigenic *Pseudo-nitzschia* bloom detected at Newport Pier on Feb 3rd and 10th - SCCOOS PI **David Caron** at USC



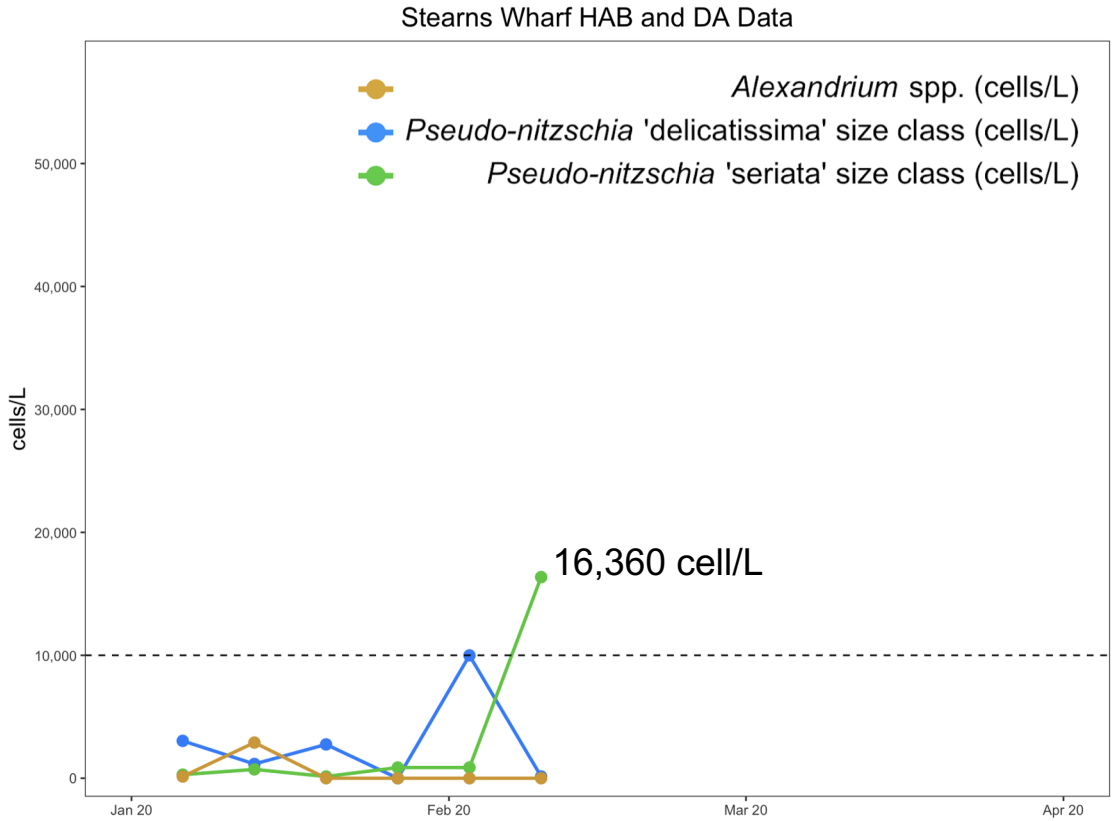
Sampling suspended starting in March

10-Feb C-HARM Pseudo-nitzschia probability



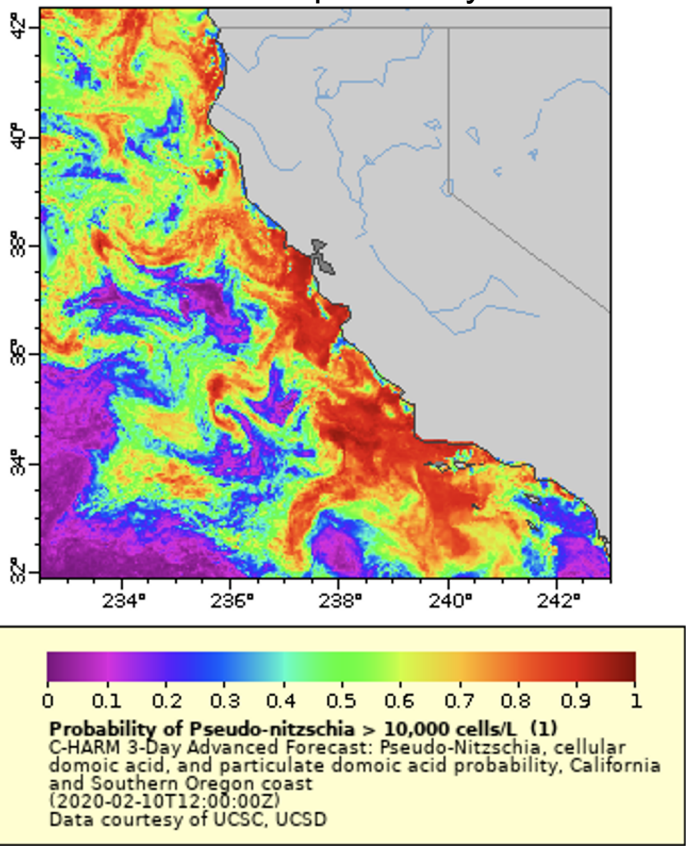
Jan-Mar 2020 HABMAP Data

Potentially toxigenic *Pseudo-nitzschia* bloom detected at Stearns Wharf on February 10th - SCCOOS PI **Mark Brzezinski and Libe Washburn** at UCSB

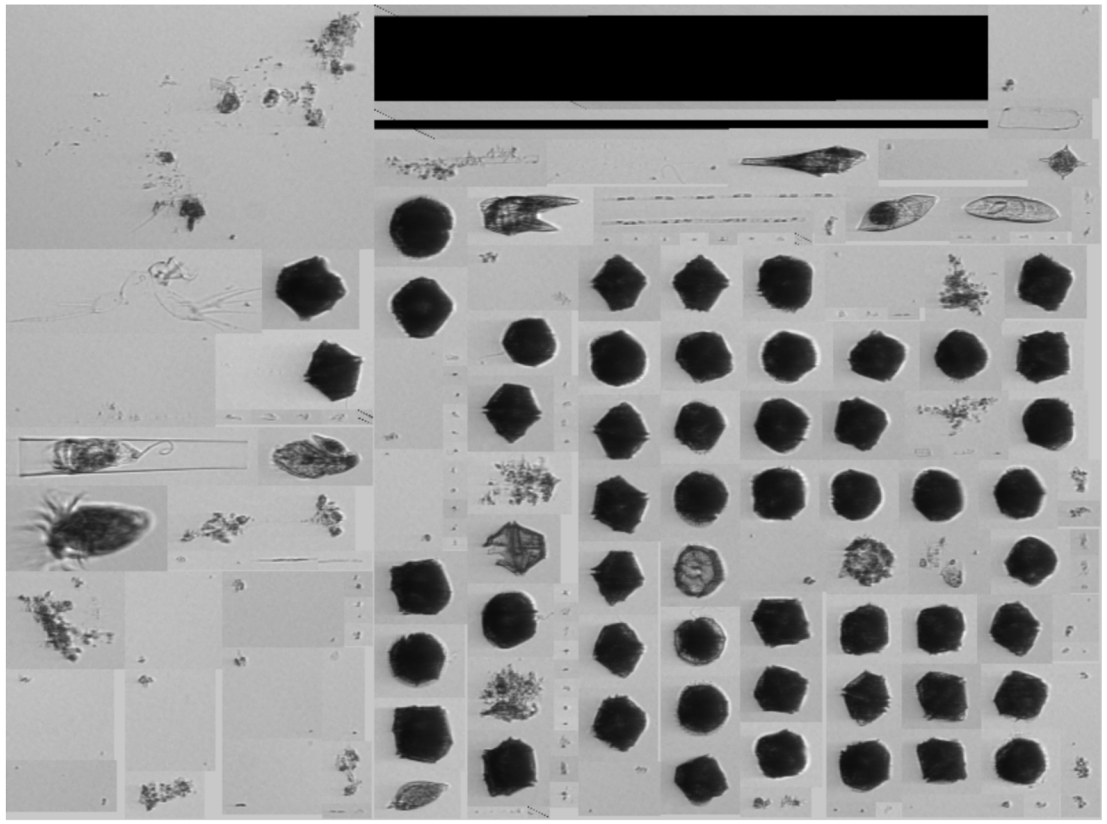


Sampling suspended starting in March

10-Feb C-HARM Pseudo-nitzschia probability



March-April: “Red Tide” of *Lingulodinium polyedra*



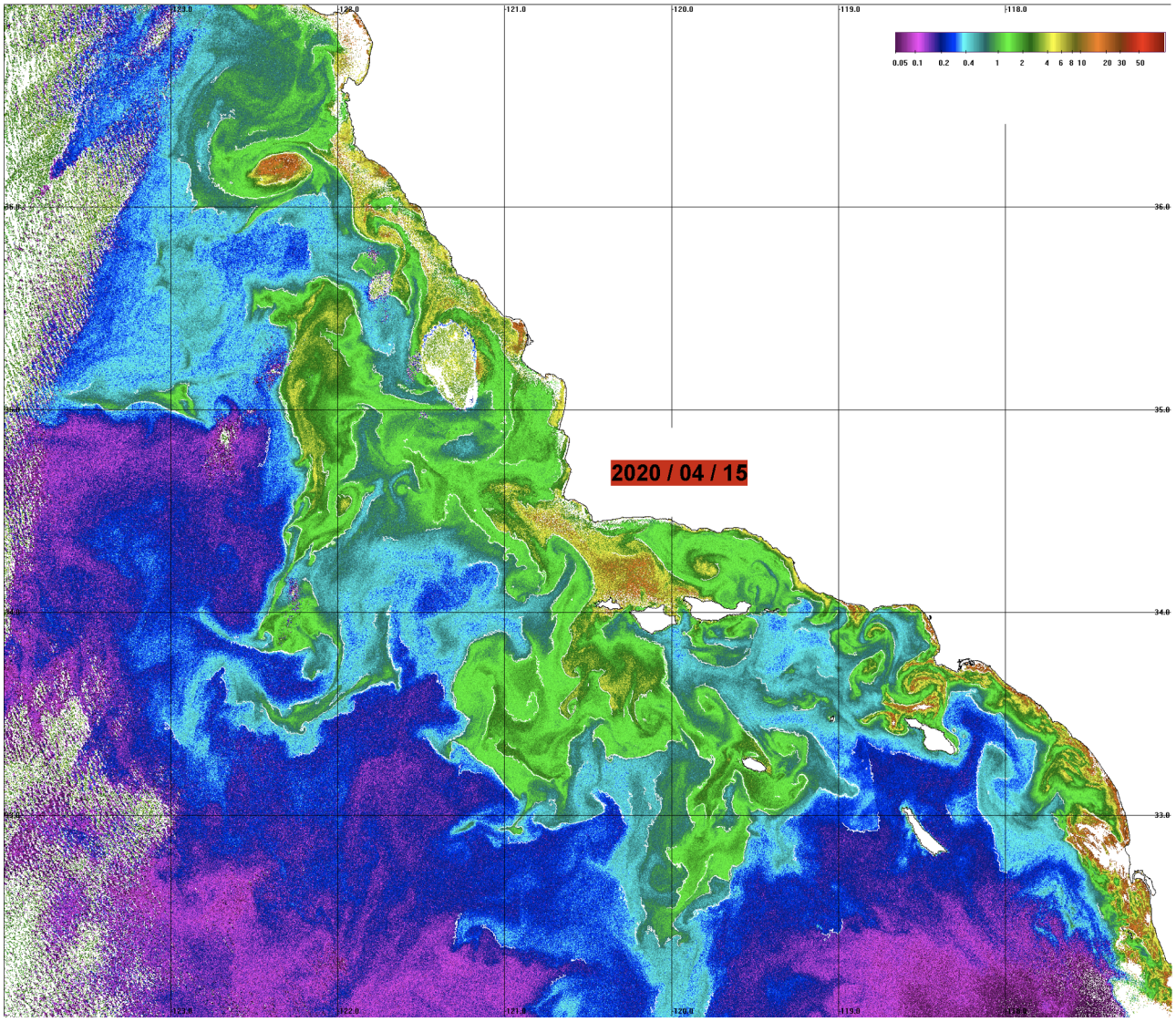
2020-04-14

Lingulodinium polyedra bloom started on shelf over 3 weeks ago as a mixed assemblage dinoflagellate bloom with *Gonyaulax* spp., now mostly *L. polyedra*

Extensive & persistent into Baja

Phytoplankton images from the Imaging FlowCytobot on Del Mar Mooring (100 m isobath) in San Diego County (PIs: **Heidi Sosik, Andrew Barton, Uwe Send)**

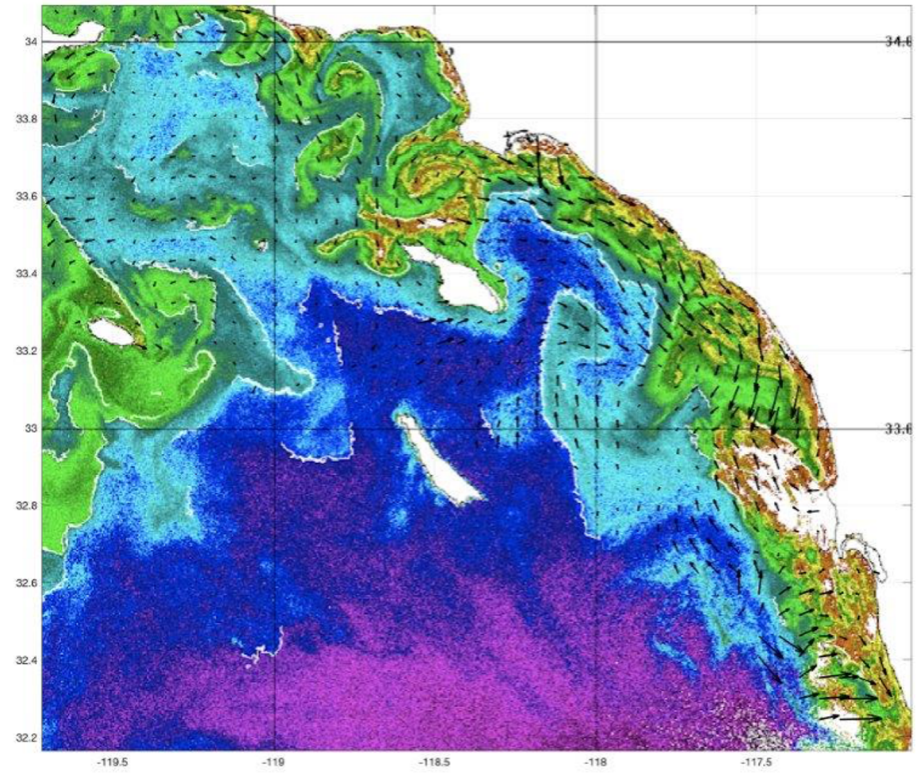
15-April: Satellite Observations of “Red Tide”



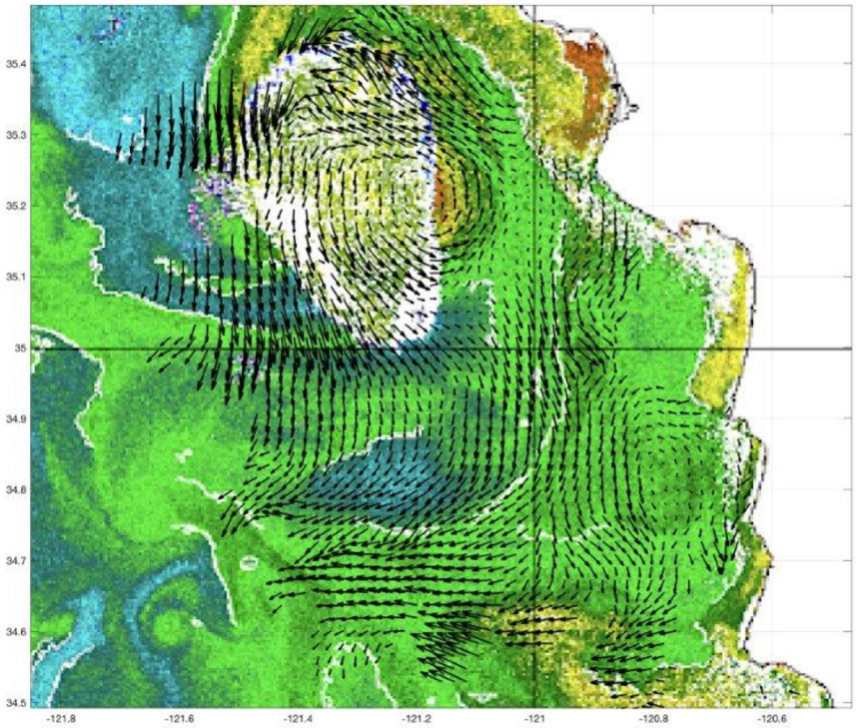
April 15, 2020 300m Chlorophyll-a image from Sentinel-3 Satellite and Ocean and Land Colour Instrument (OLCI). **Figure credit: Mati Kahru, SIO**

Note: Image processed for maximum coverage, not for compositing valid values. Clouds and cloud edges have not been filtered out.

15-April: Satellite Observations of “Red Tide”

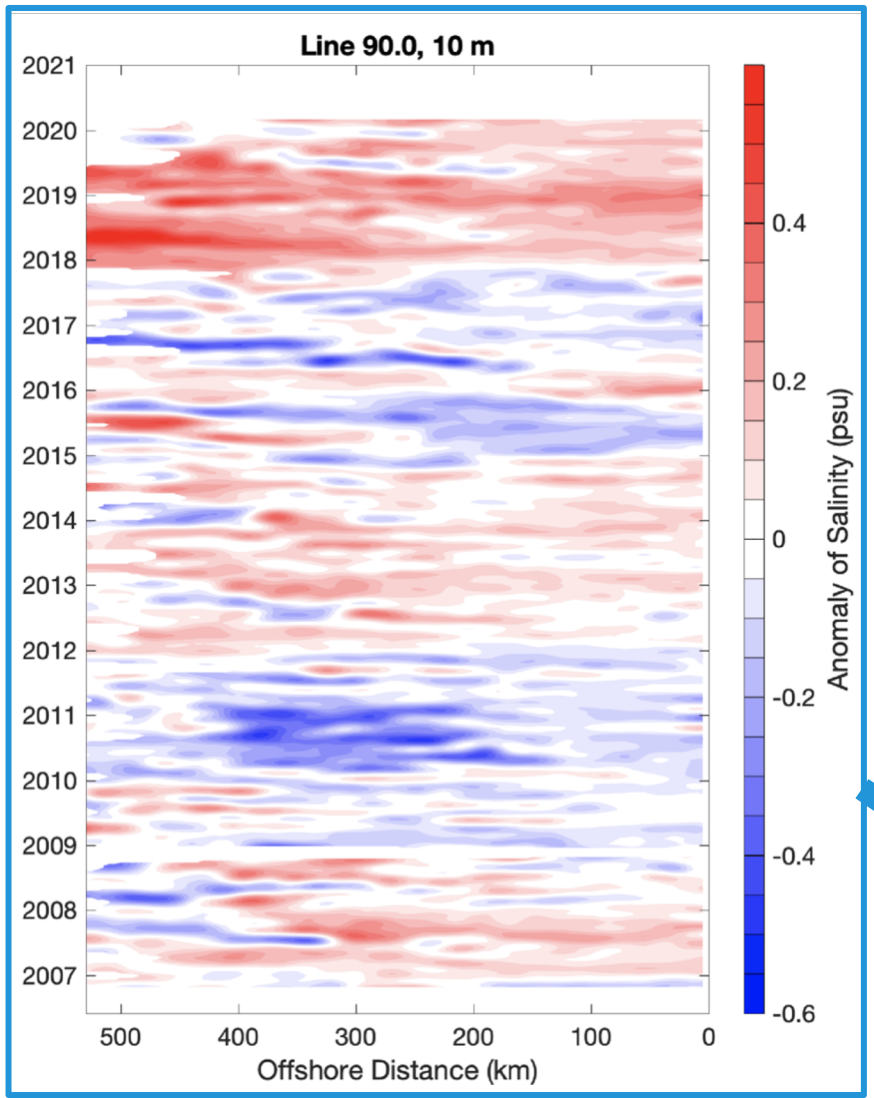


25-hr averaged High Freqency Radar surface current vectors overlaid on 300m Chlorophyll-a image from Sentinel-3 Satellite and Ocean and Land Colour Instrument (OLCI).
Figure credit: Mark Otero, CORDC



California Salinity Anomaly

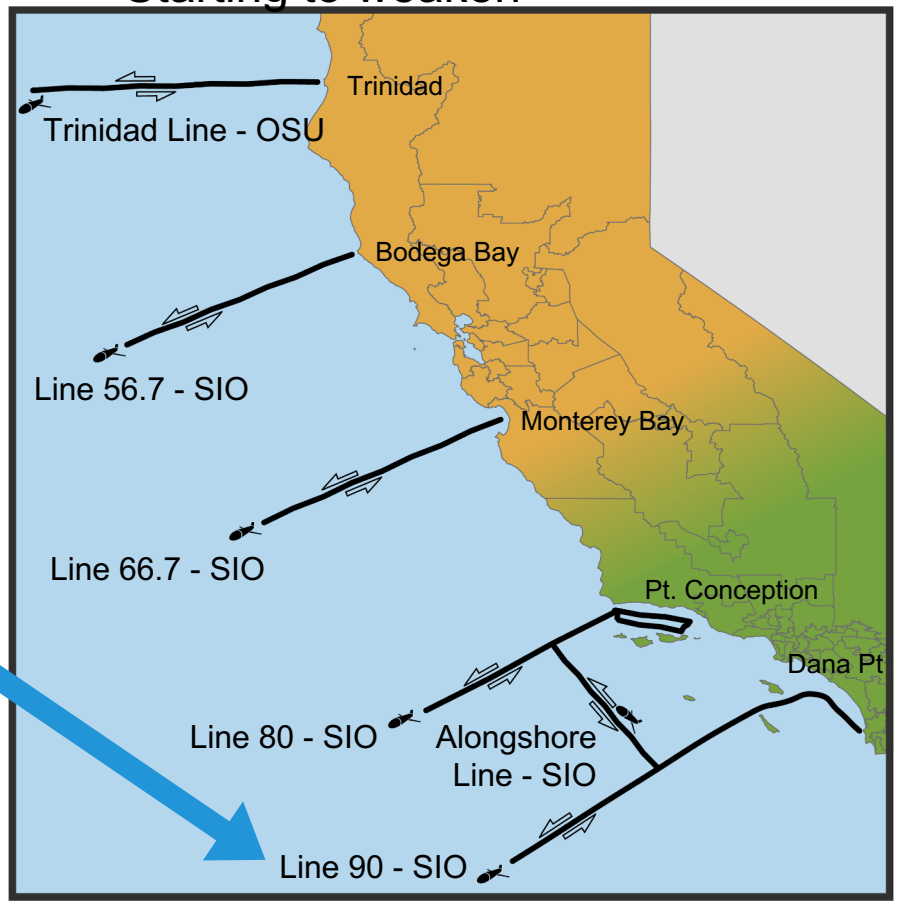
Figure from **Dan Rudnick, SIO**



Fresh during 2014-2017

Salinity Anomaly 2018-2019

- Strongest at surface
- Starting to weaken



Coastal Data Information Program (CDIP)

West coast wave climate during Q1

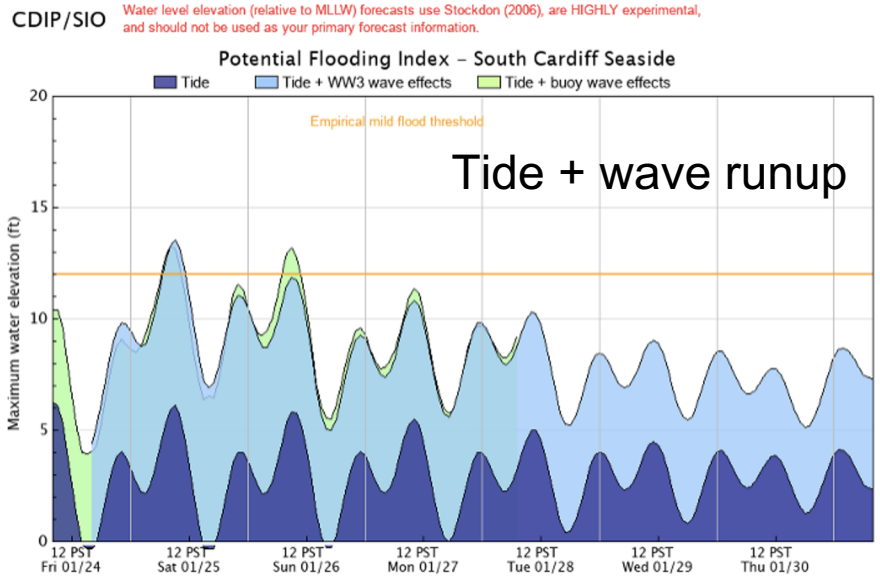
- Relatively weak after a normal January

Coastal Flooding

- Flooding events successfully predicted at Cardiff and Carlsbad, CA in January
- Working to expand forecasts to other CA state parks

CDIP 248 Angeles Point, WA

- New station providing wave, surface current, SST data in Strait of Juan de Fuca



cdip.ucsd.edu

Recent Publications

Barth A, Walter RK, Robbins I, & Pasulka A. (2020). Seasonal and interannual variability of phytoplankton abundance and community composition on the Central Coast of California. *Mar Ecol Prog Ser* 637:29-43. doi.org/10.3354/meps13245

Stauffer B, Sukhatme G & Caron D. (2020). Physical and Biogeochemical Factors Driving Spatially Heterogeneous Phytoplankton Blooms in Nearshore Waters of Santa Monica Bay, USA. *Estuaries and Coasts*. doi.org/10.1007/s12237-020-00704-5

Bresnahan P, Wirth T, Martz T, Shipley K, Rowley V, Anderson C, & Grimm T. (2020). Equipping smart coasts with marine water quality IoT sensors. *Results in Engineering.* doi.org/10.1016/j.rineng.2019.100087

Zaba K, Rudnick D, Cornuelle B, Gopalakrishnan G, & Mazloff M. (2020). Volume and heat budgets in the coastal California Current System: Means, annual cycles and interannual anomalies of 2014-2016. *J. Phys. Oceanography*. doi.org/10.1175/JPO-D-19-0271.1

DeNezzo N. (2020). “Integrating data to assess California's marine protected areas.” *California Sea Grant.* caseagrant.ucsd.edu/news/

Call Agenda

- Project Recap & Updates (Dan McEvoy)
- Regional Climate and ENSO brief (Dan McEvoy)
- Guest speaker: Dr. Christine Albano: *Using Satellite Remote Sensing and Climate Data to Assess Status and Trends of Groundwater Dependent Ecosystem Vegetation in Nevada*
- IOOS Nearshore Conditions brief (Jan Newton, Alex Harper, Clarissa Anderson)
- **Discussion - Environmental conditions and impacts reporting (All)**
  - **Additional impacts to share?**

- **Next webinar: Tuesday, July 21st 2020**

THANK YOU!