



# **NOAA West Watch**

*Reporting Regional Environmental  
Conditions & Impacts in the West*

**May 22, 2018**

# Call Agenda

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- **Project Recap & Updates (Polly Hicks)**
- El Niño and Regional Climate brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Jan Newton, Alex Harper, Megan Hepner)
- Environmental conditions and impacts reporting and discussion (Polly Hicks)
- Discussion

# Project Recap and Updates

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- NOAA West Watch bi-monthly webinars are a project of the NOAA West Regional Coordination Team
- Goals of the project:
  - **Document and share** environmental conditions information and impacts on human systems and NOAA mission at the regional scale
  - **Improve awareness** of environmental observations and human system impacts across NOAA mission lines
  - **Improve regional communication and coordination**
  - **Improve external communication** of regional impacts
- Next webinar: July 24<sup>th</sup>, 1-2PM PDT/ 2-3PM MDT

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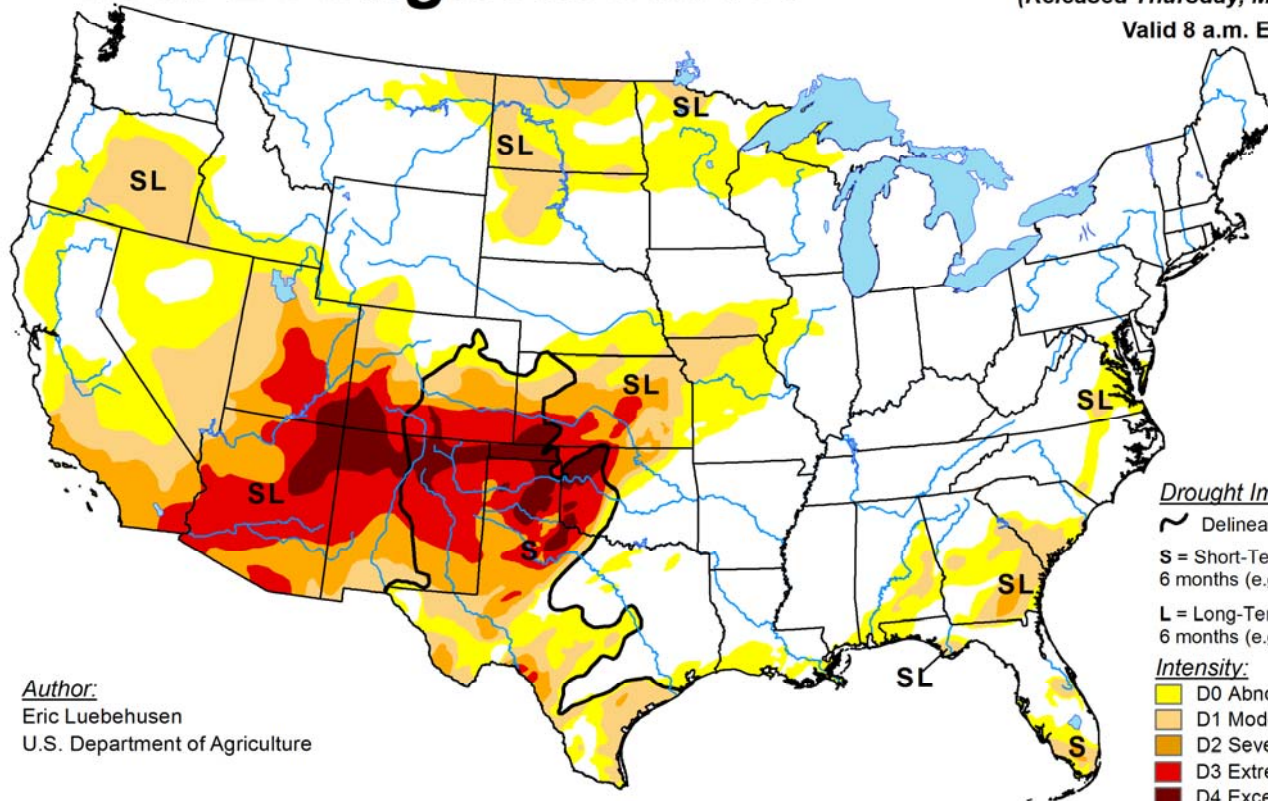


# Current Drought Conditions



## U.S. Drought Monitor

May 15, 2018  
 (Released Thursday, May. 17, 2018)  
 Valid 8 a.m. EDT



Author:  
 Eric Luebehusen  
 U.S. Department of Agriculture

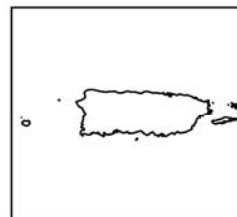
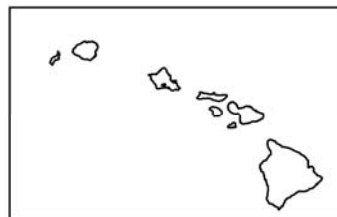
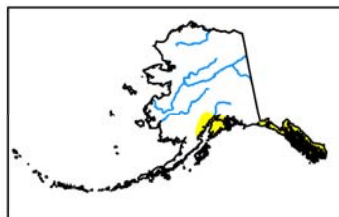
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- Yellow: D0 Abnormally Dry
- Light Orange: D1 Moderate Drought
- Orange: D2 Severe Drought
- Red: D3 Extreme Drought
- Dark Red: D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



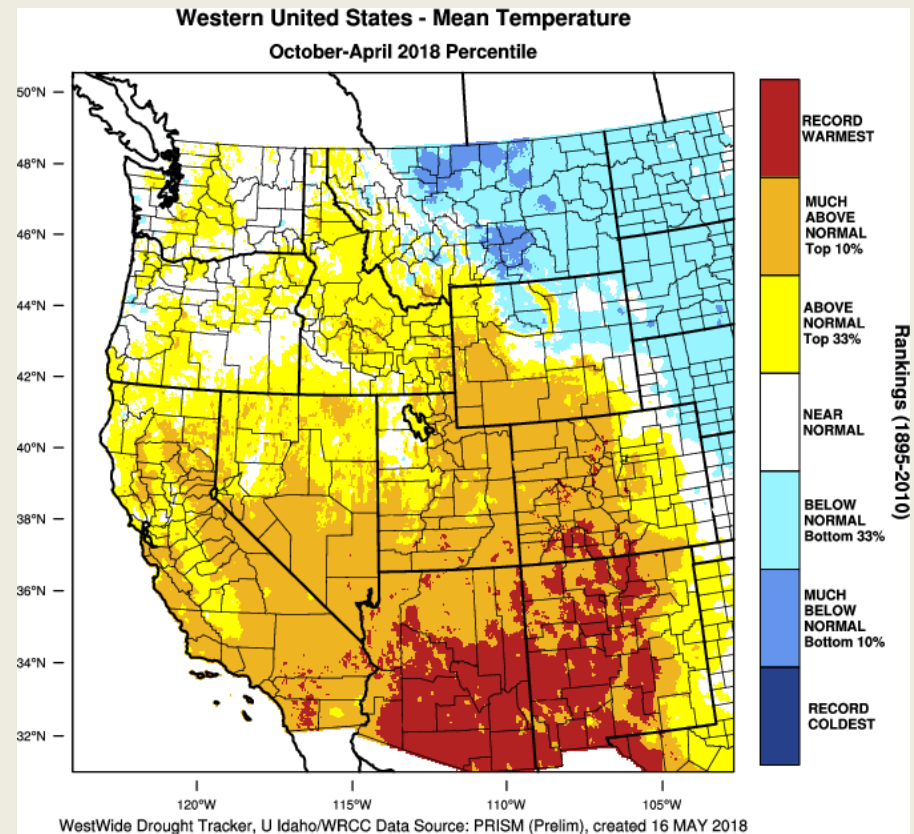
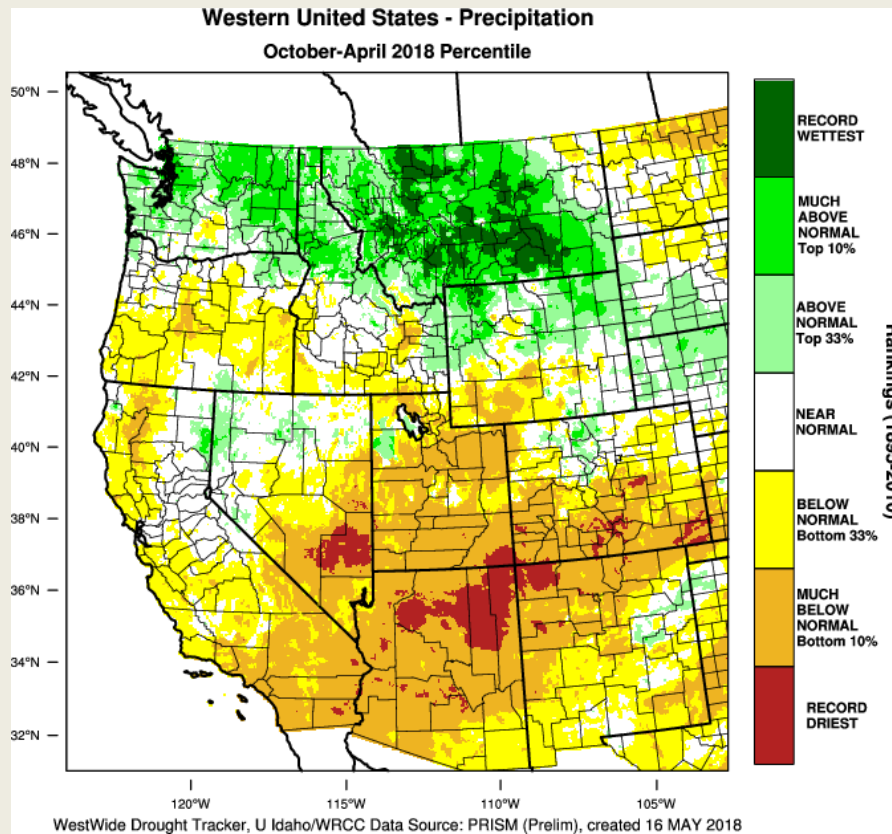
<http://droughtmonitor.unl.edu/>

# Precipitation and Temperature



## October 2017 – April 2018 Precipitation Percentiles

## October 2017 – April 2018 Temperature Percentiles

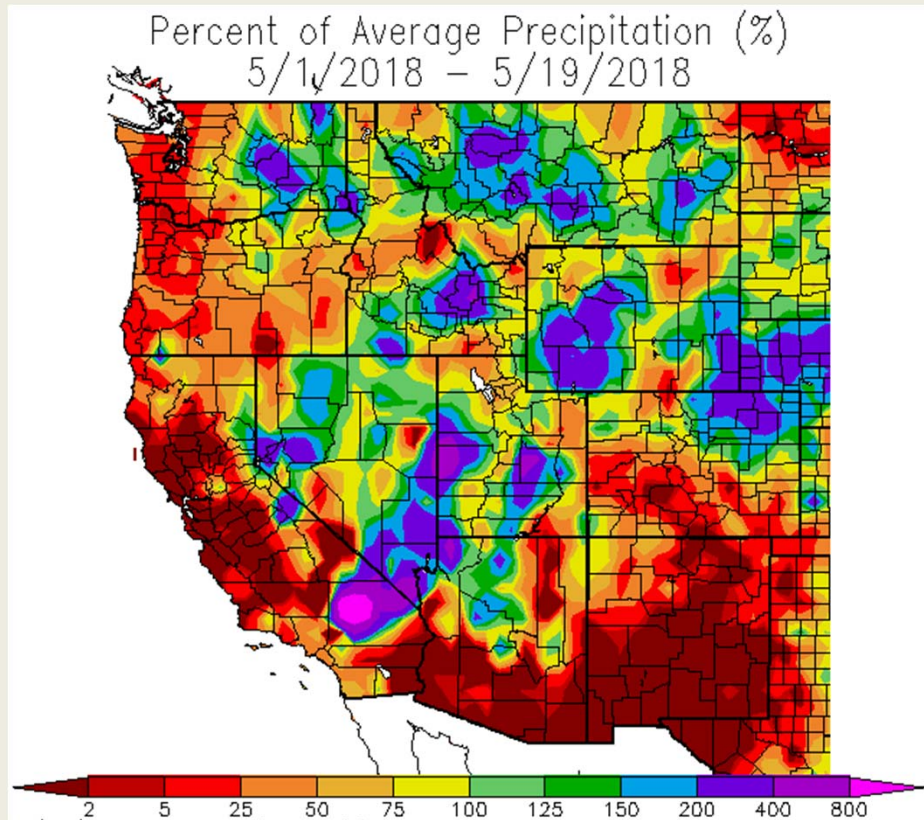




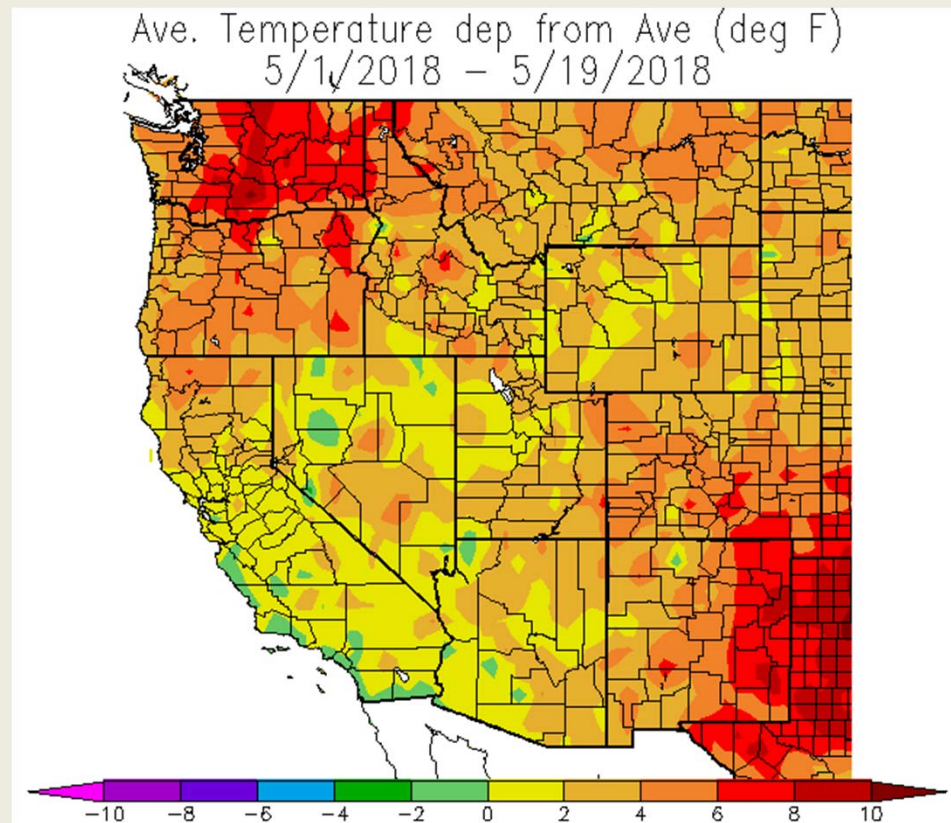
# Precipitation and Temperature



**May 1-19**  
**% of Average Precipitation**



**May 1-19**  
**Temperature Anomalies**

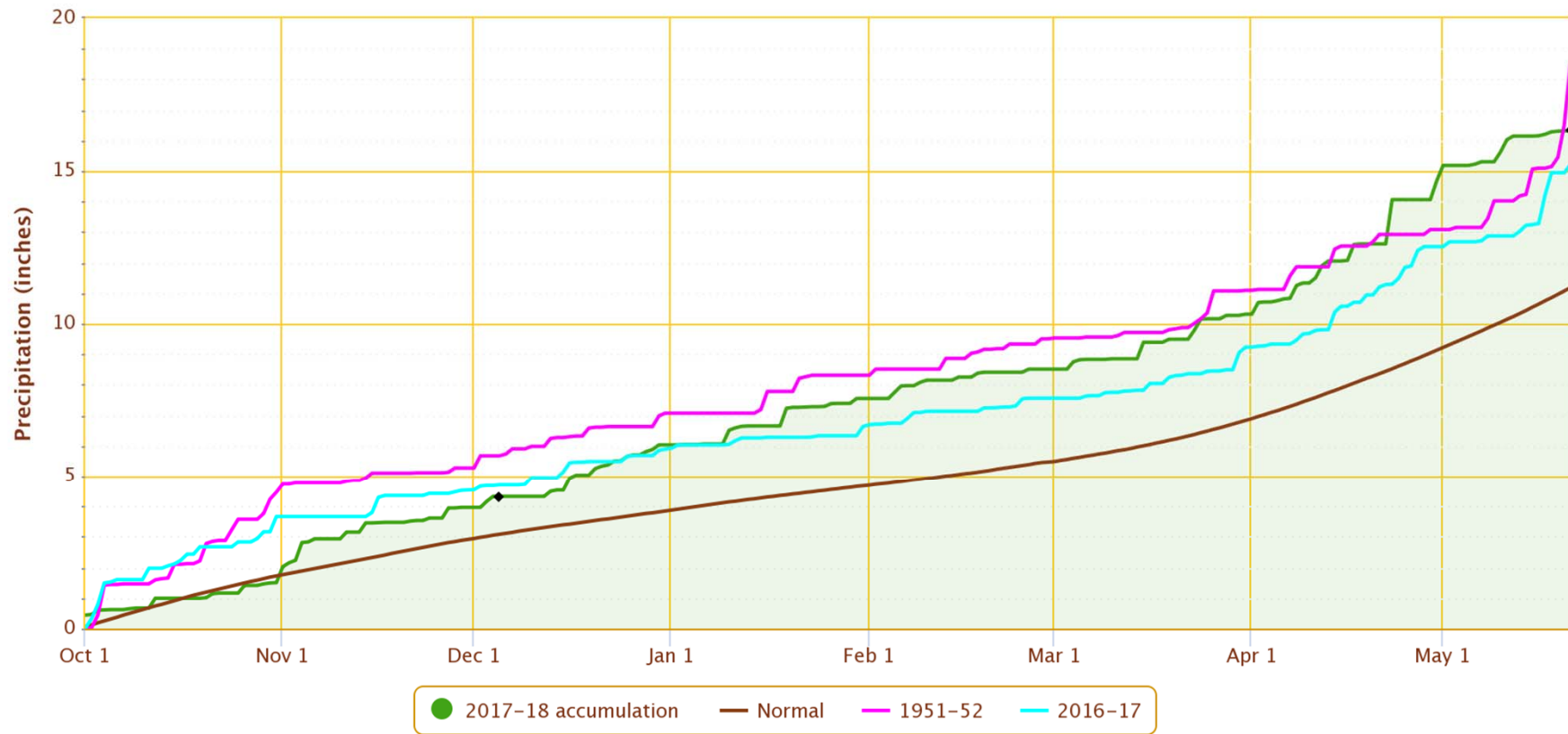


# Bozeman, MT Precipitation



Accumulated Precipitation – BOZEMAN MONTANA STATE UNIVERSITY, MT

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

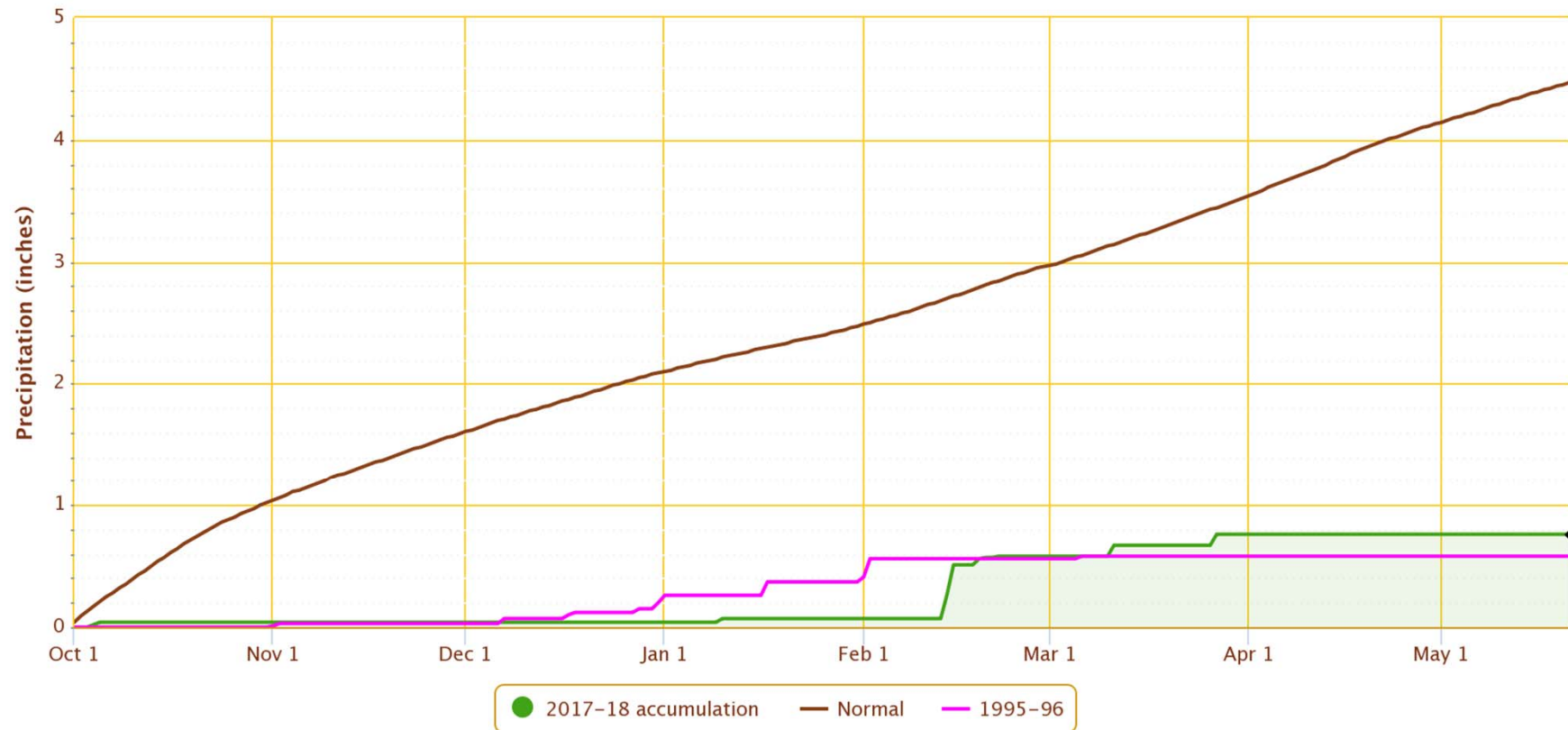
- 2<sup>nd</sup> wettest water year-to-date (1892-present)

# Albuquerque, NM Precipitation



Accumulated Precipitation – ALBUQUERQUE INTL AP, NM

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values

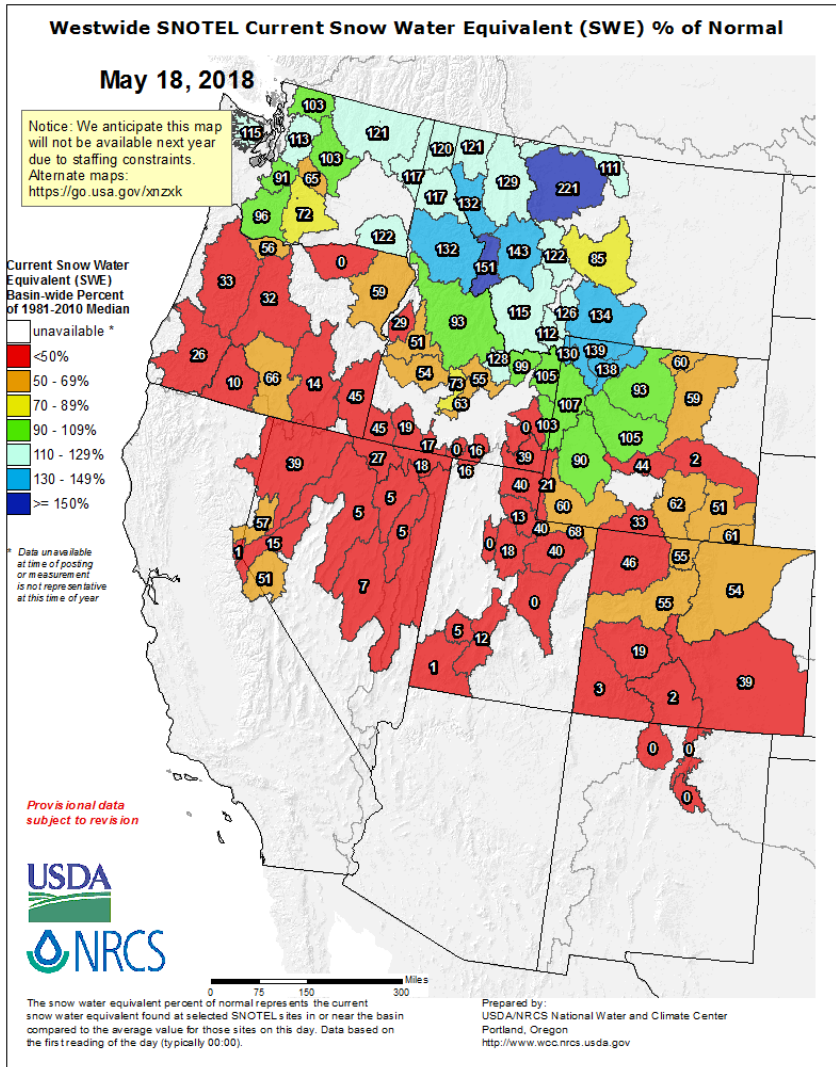


Powered by ACIS

- 3<sup>rd</sup> driest water year-to-date (1890-present)



# Snowpack



## Statewide Summary of Snow Water Content

### Current Regional Snowpack from Automated Snow Sensors

% of April 1 Average / % of Normal for This Date



NORTH	
Data as of May 21, 2018	
Number of Stations Reporting	30
Average snow water equivalent (inches)	1.4
Percent of April 1 Average (%)	5
Percent of normal for this date (%)	13

CENTRAL	
Data as of May 21, 2018	
Number of Stations Reporting	42
Average snow water equivalent (inches)	2.6
Percent of April 1 Average (%)	9
Percent of normal for this date (%)	18

SOUTH	
Data as of May 21, 2018	
Number of Stations Reporting	27
Average snow water equivalent (inches)	1.6
Percent of April 1 Average (%)	6
Percent of normal for this date (%)	11

STATE	
Data as of May 21, 2018	
Number of Stations Reporting	99
Average snow water equivalent (inches)	1.9
Percent of April 1 Average (%)	7
Percent of normal for this date (%)	15

Statewide Average: 7% / 15%

**15% of normal statewide**

Data as of May 21, 2018

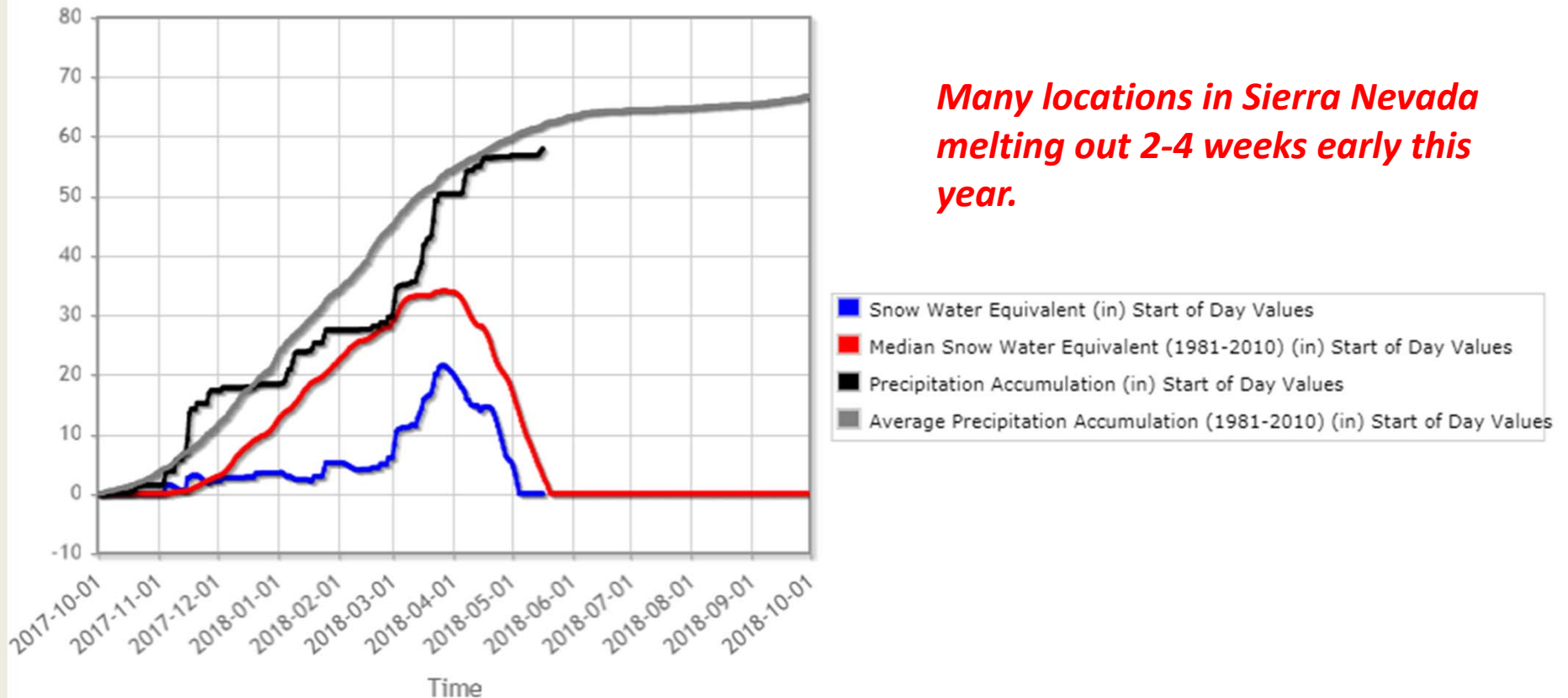
Updated 05/21/2018 11:45 AM

# Snowpack

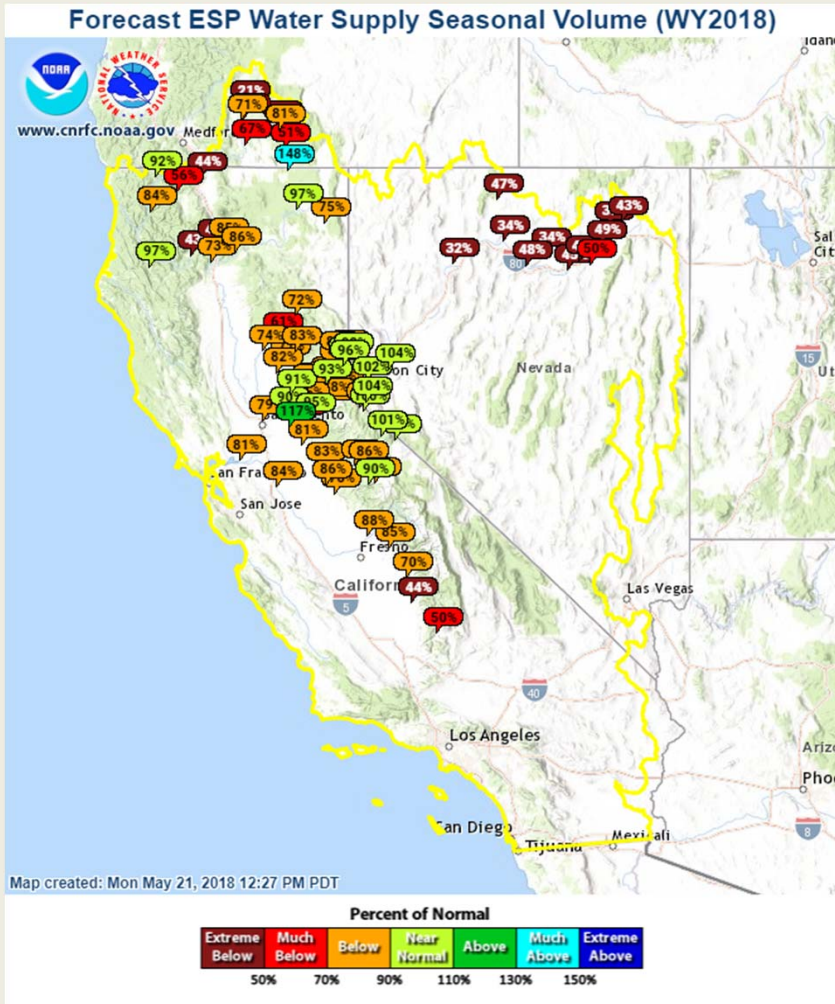


- Central Sierra Snow Lab, CA (Donner Pass)
- Melt out date 2018: May 5
- Normal melt out date: May 21

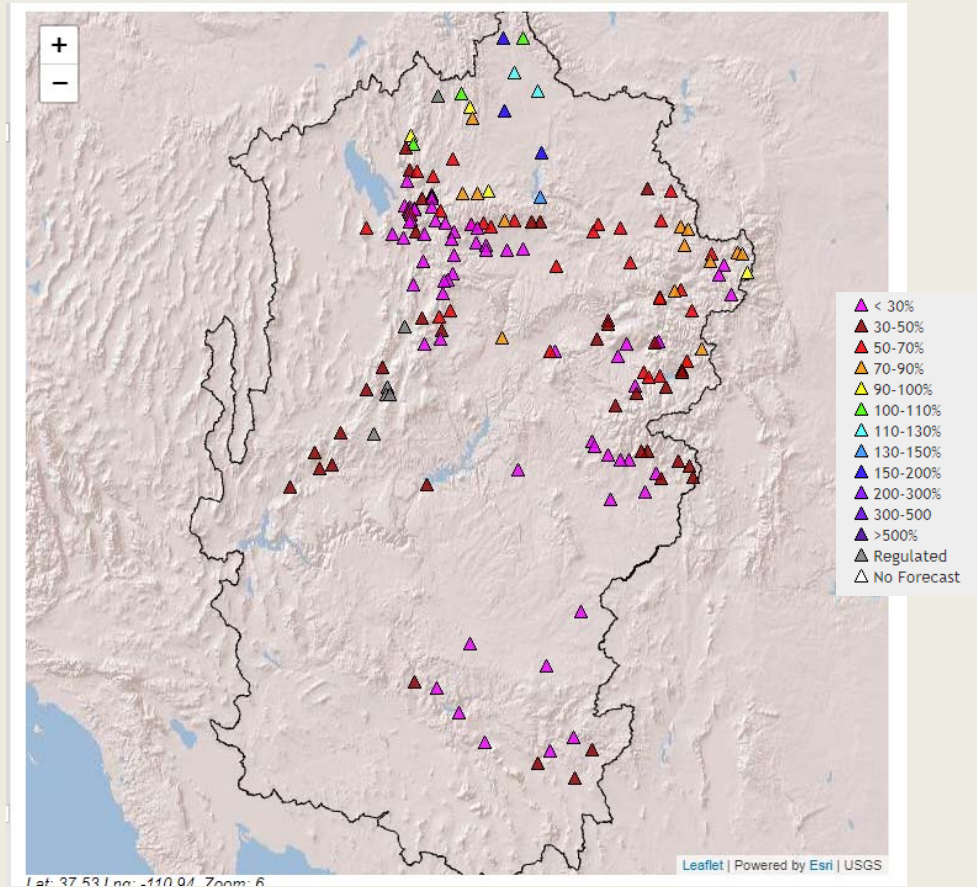
Css Lab (428) California SNOTEL Site - 6894 ft Reporting Frequency: Daily; Date Range: 2017-10-01 to 2018-09-30



# April-July Streamflow Forecasts, May 21



## Colorado River Basin

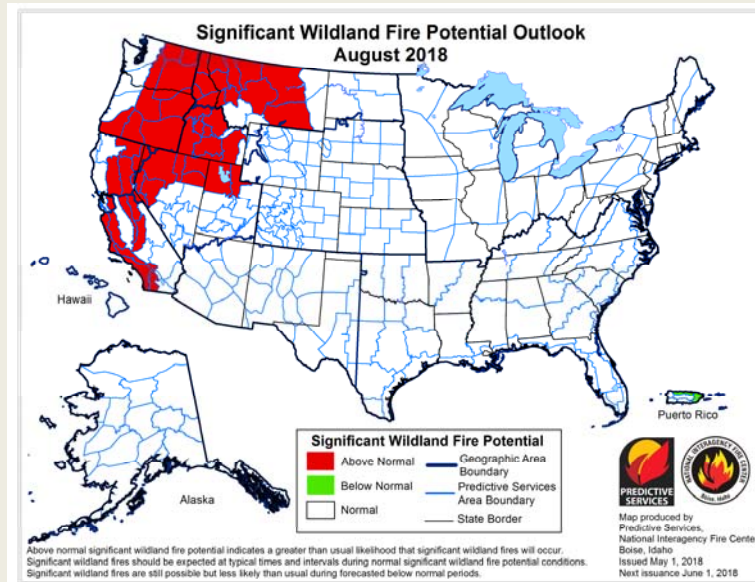
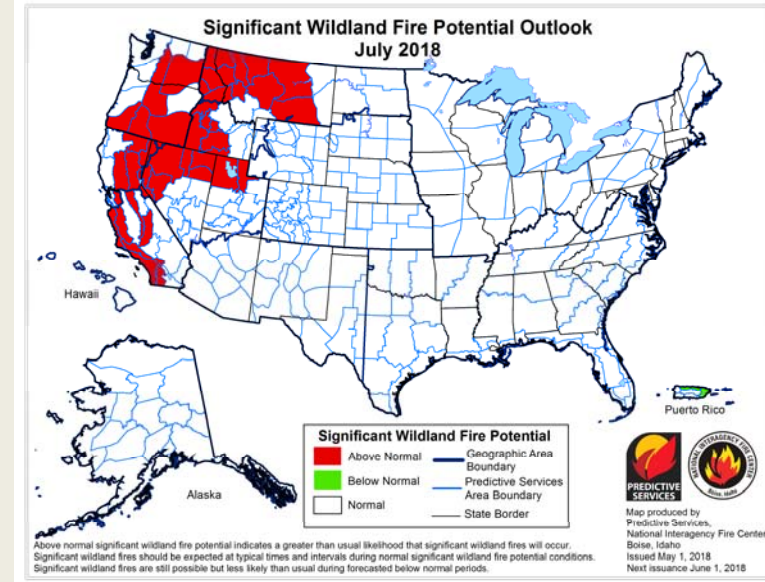
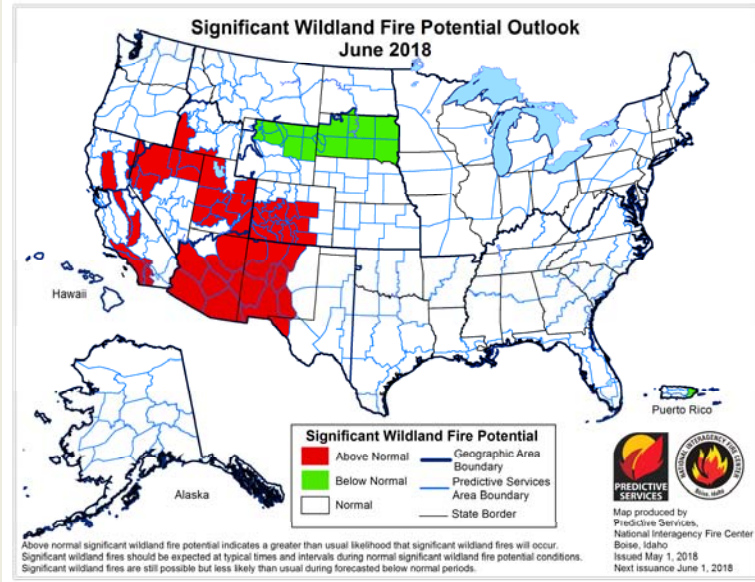


<https://www.cbrfc.noaa.gov/>

<https://www.cnrfc.noaa.gov/>



# Significant Wildland Fire Potential Outlook



# ENSO Status

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- ENSO Alert System Status: **Final La Niña Advisory**
- ENSO-neutral conditions are present. \*
- Equatorial sea surface temperatures (SSTs) are near-to-below average across the eastern Pacific Ocean.
- ENSO-neutral is favored through September-November 2018, with the possibility of El Niño nearing 50% by Northern Hemisphere winter 2018-19.

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:

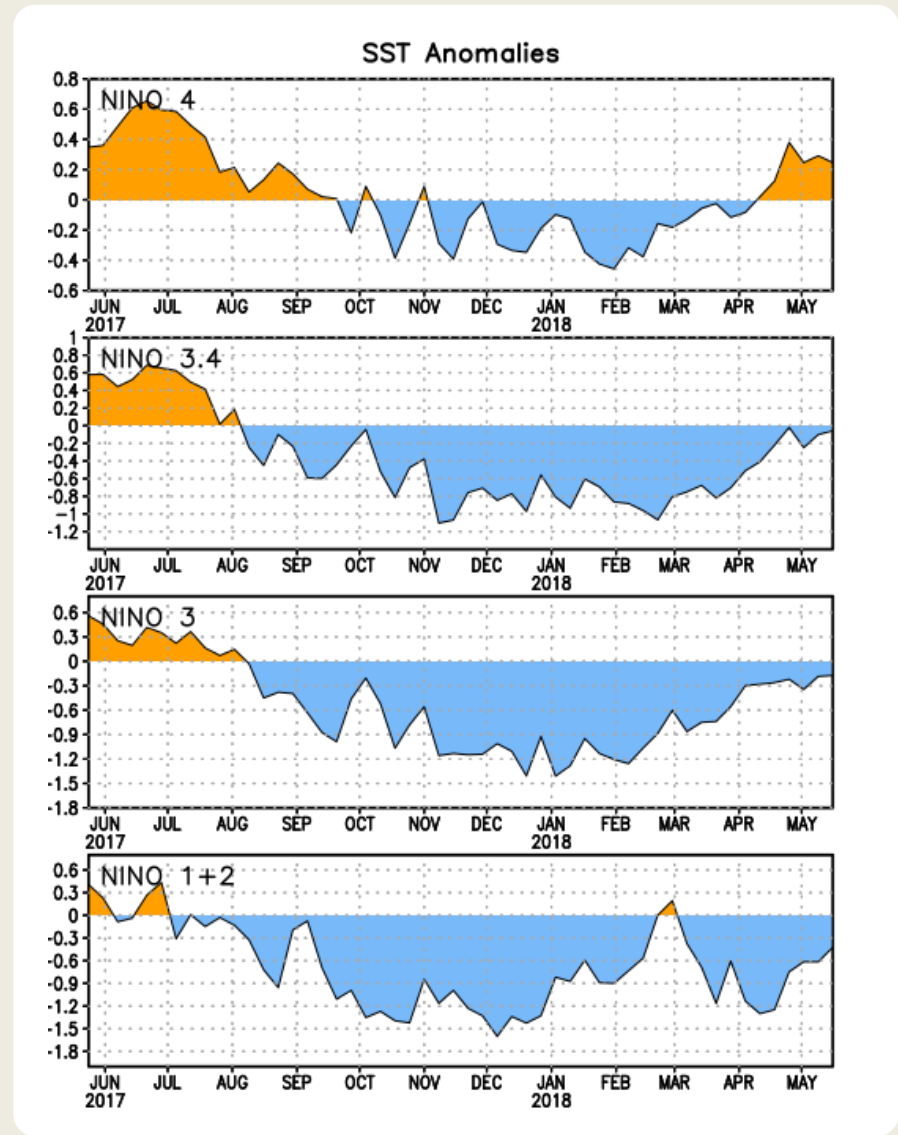
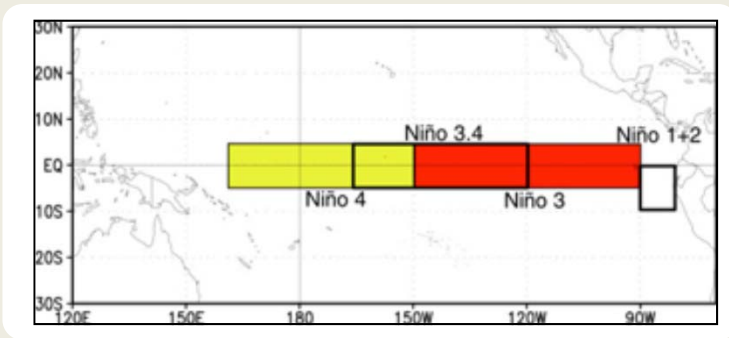
[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/).

# Niño Region SST Departures (°C) Recent Evolution

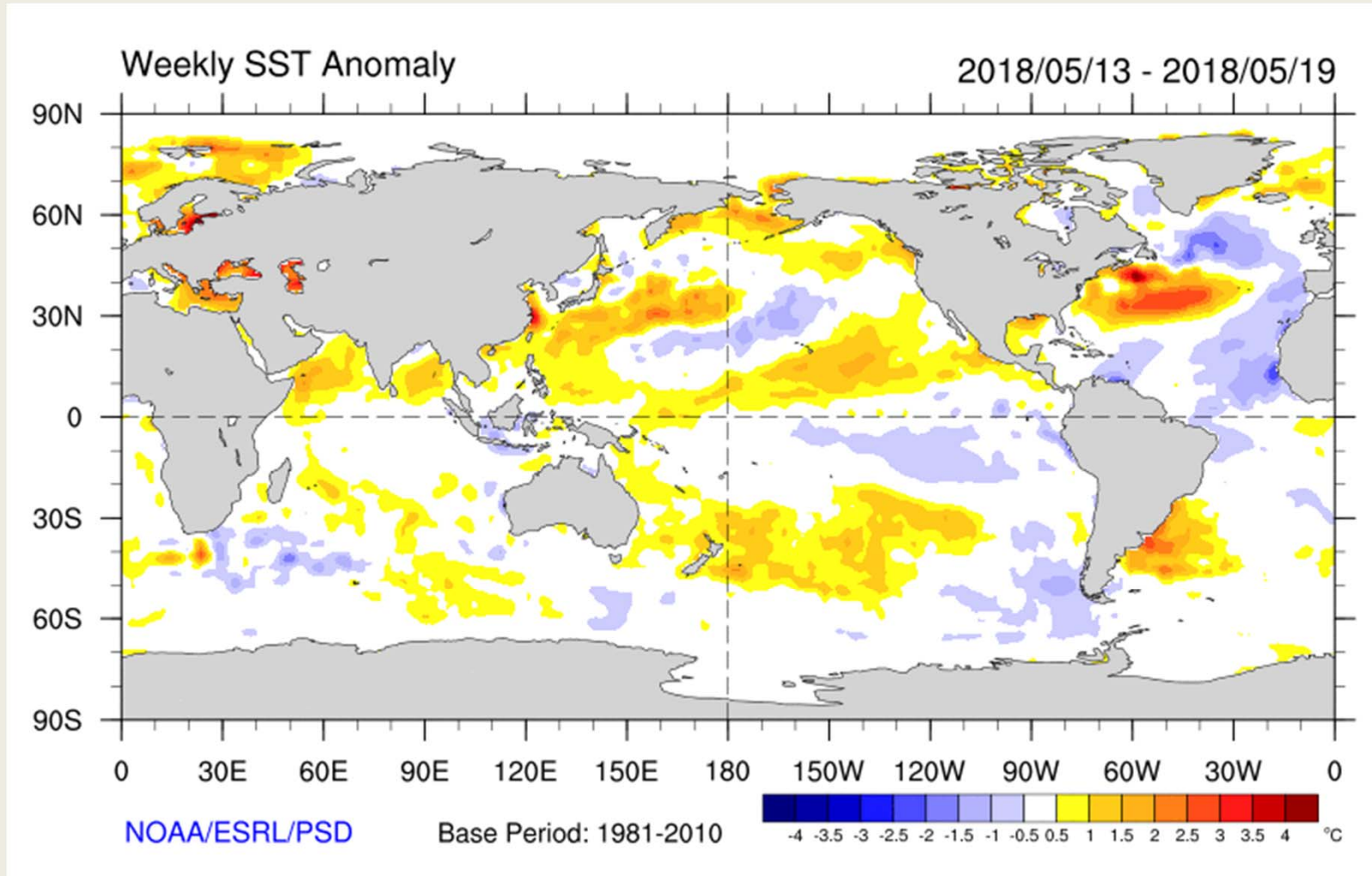


The latest weekly SST departures are:

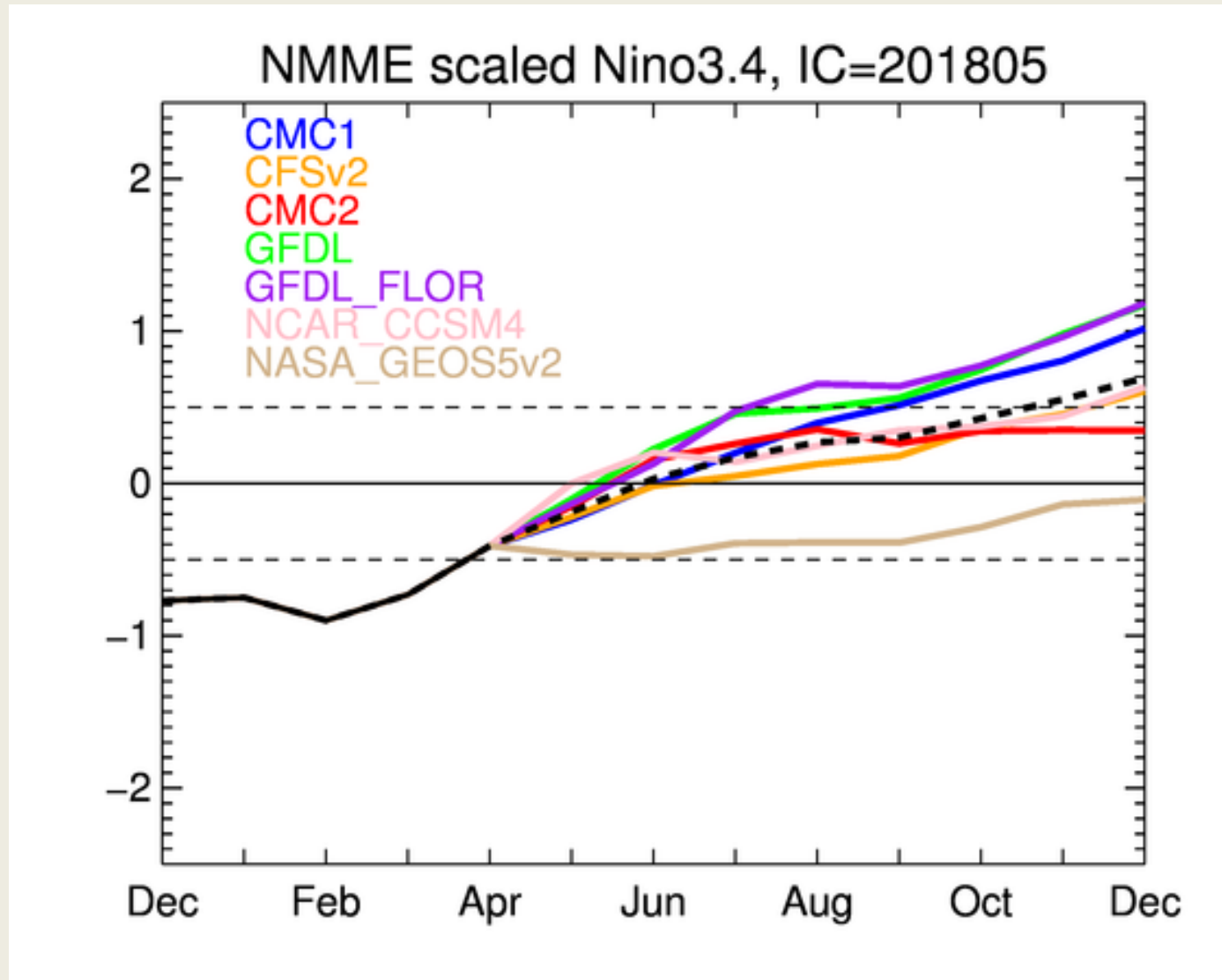
Niño 4	0.2°C
Niño 3.4	-0.1°C
Niño 3	-0.2°C
Niño 1+2	-0.4°C



# Current Sea Surface Temperatures



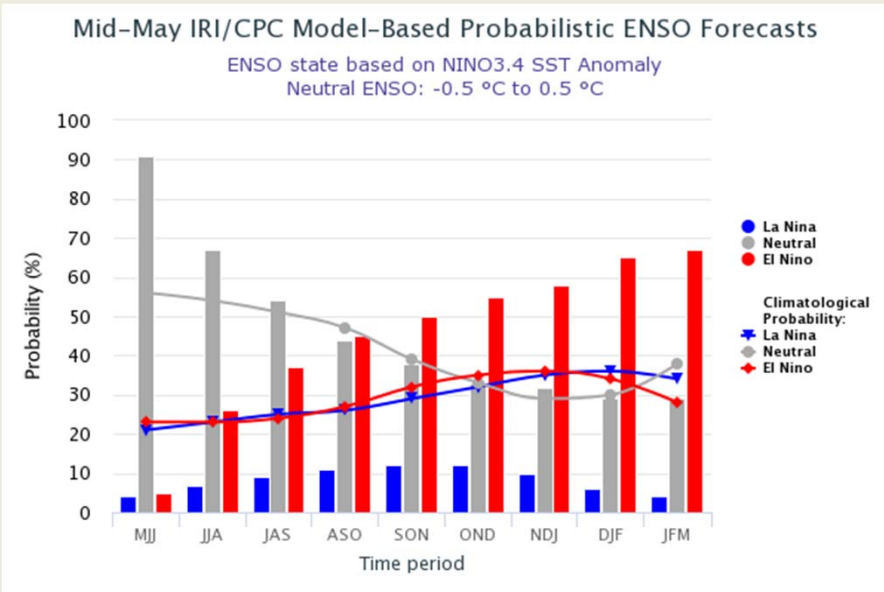
# ENSO Forecasts



Source: NOAA/CPC

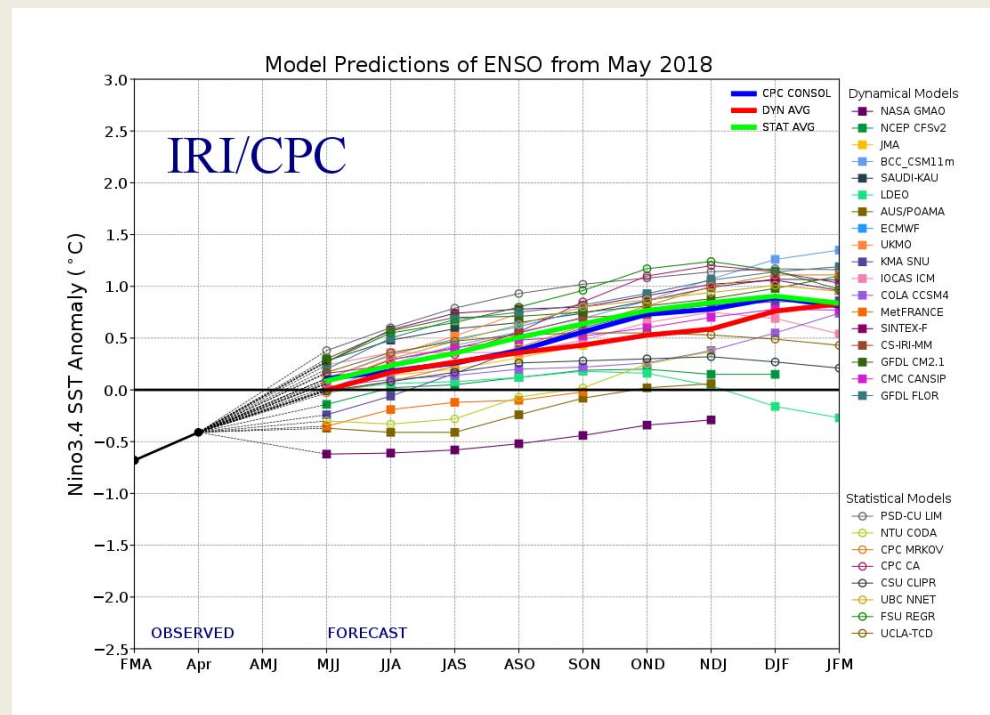


# ENSO Forecasts



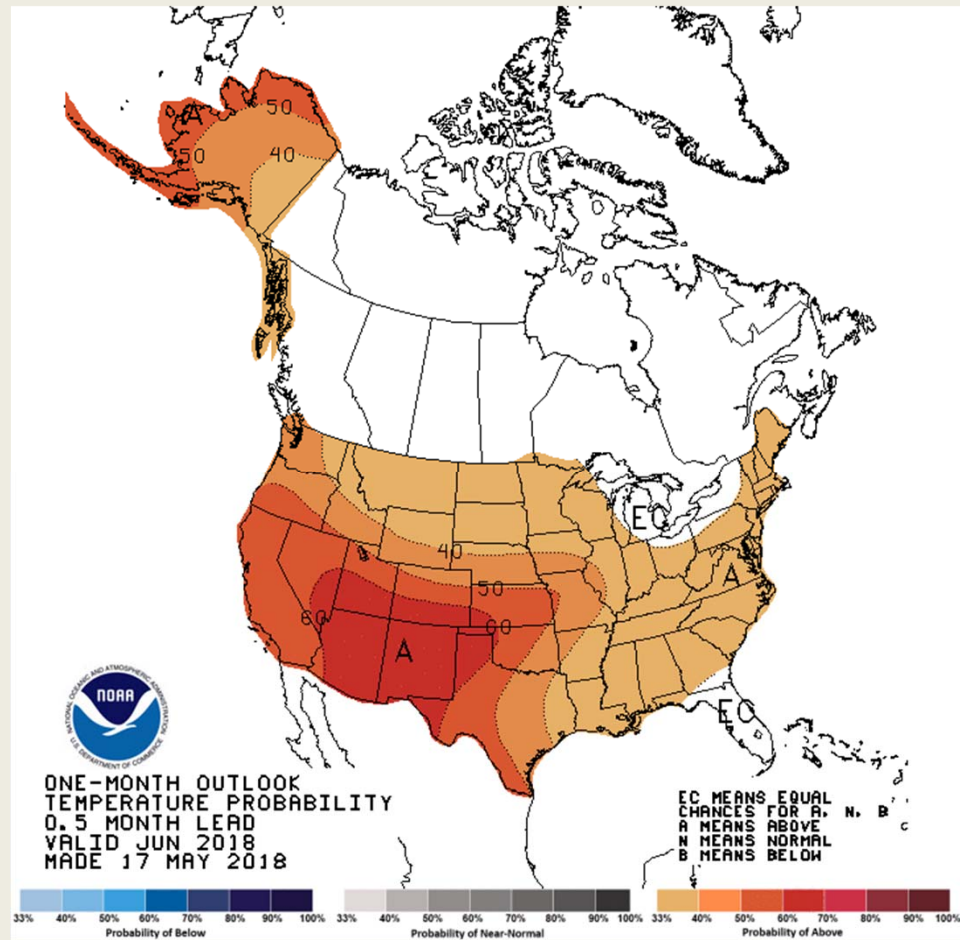
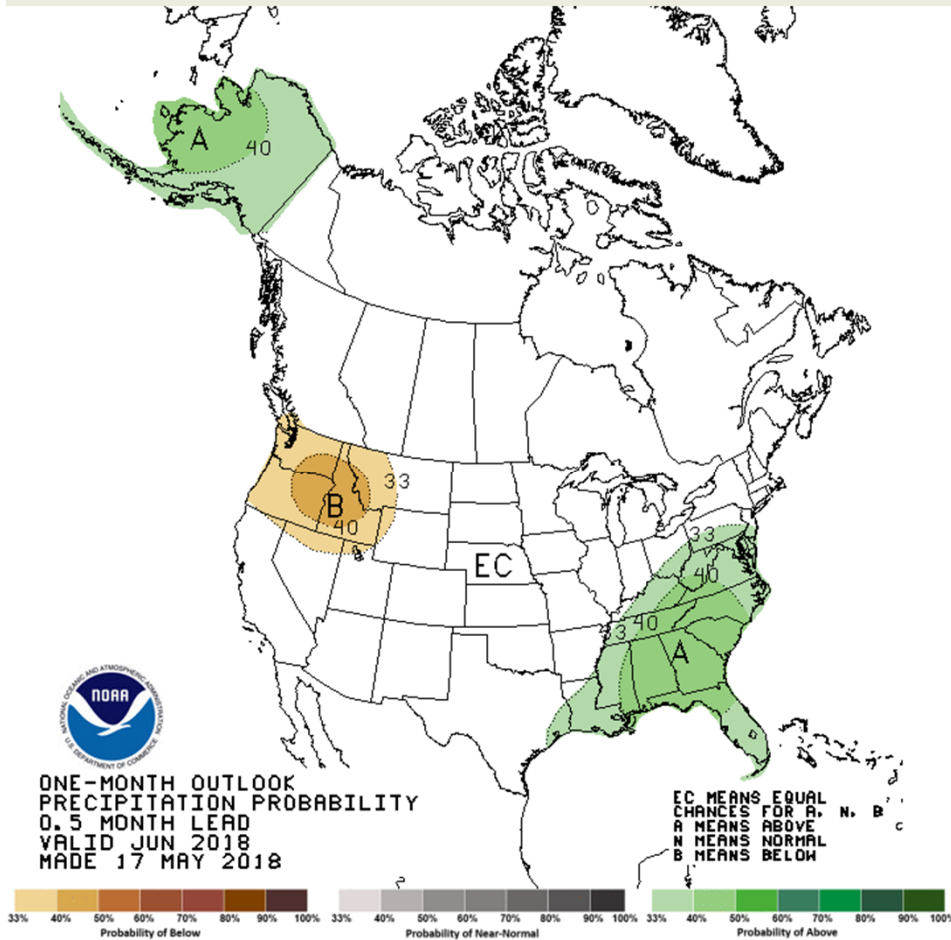
CPC/IRI El Niño forecast:

NMME models + other dynamical models + statistical models



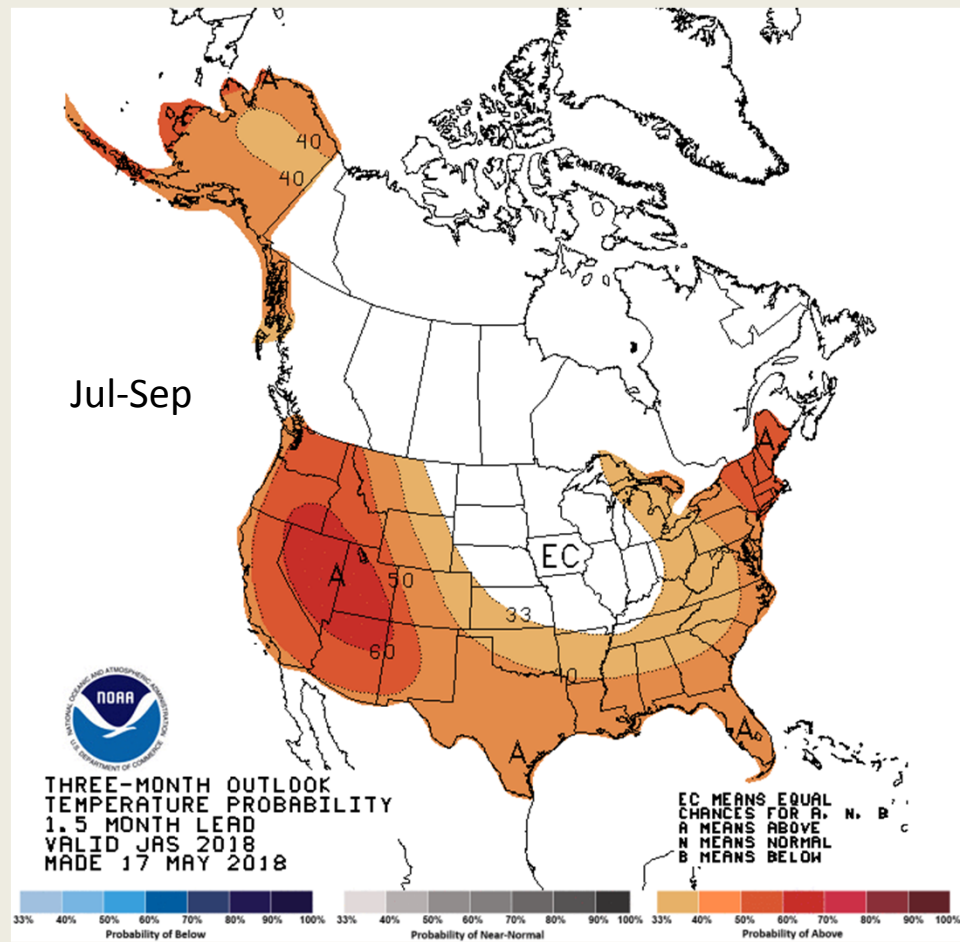
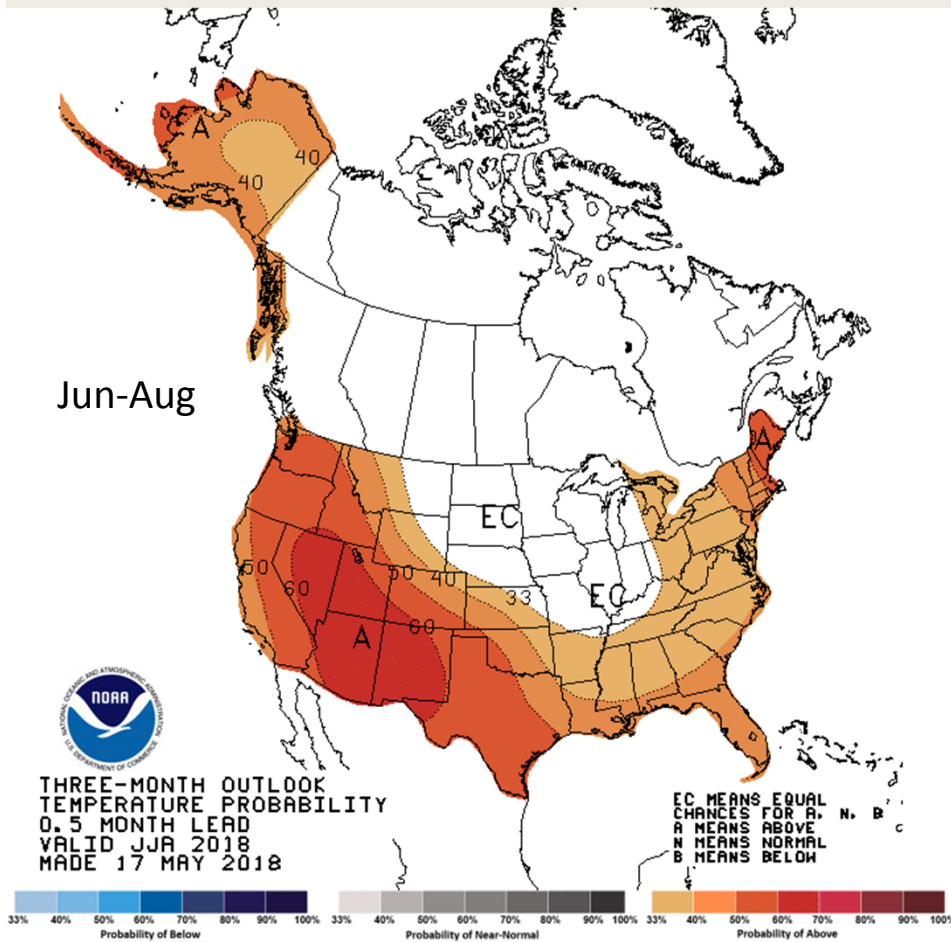
Source: CPC/IRI

# June U.S. Forecasts



Source: NOAA/CPC

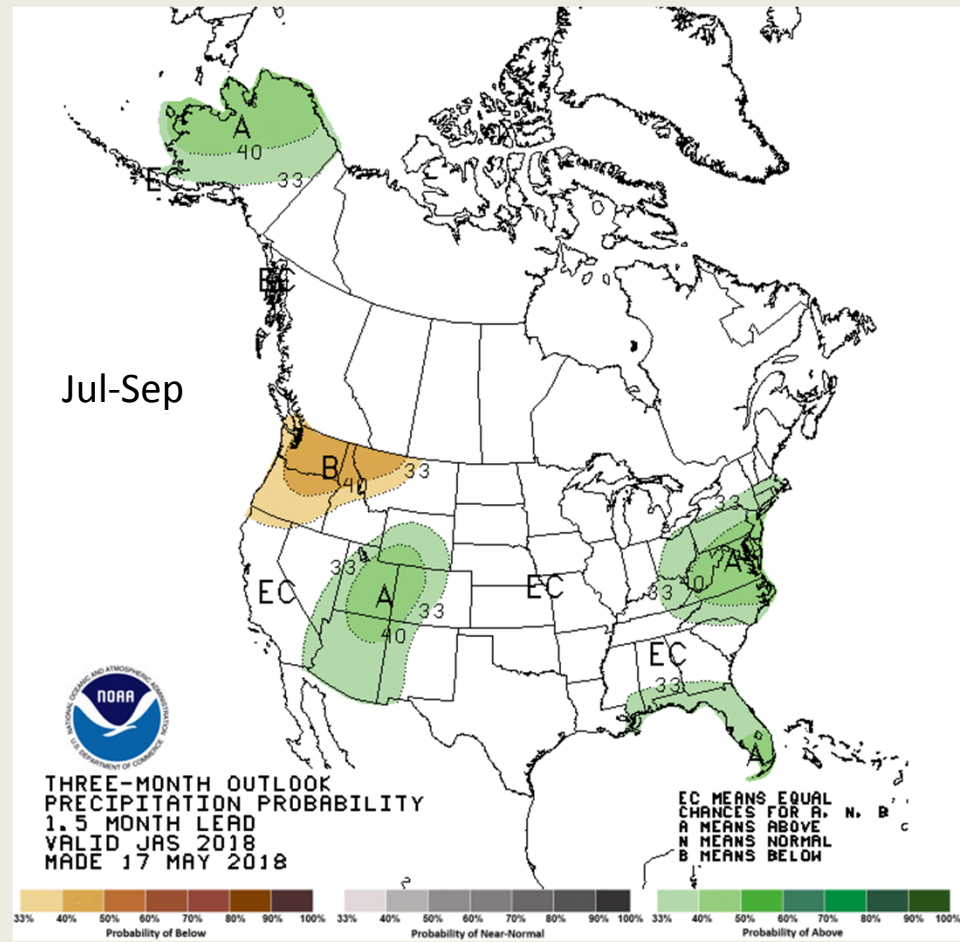
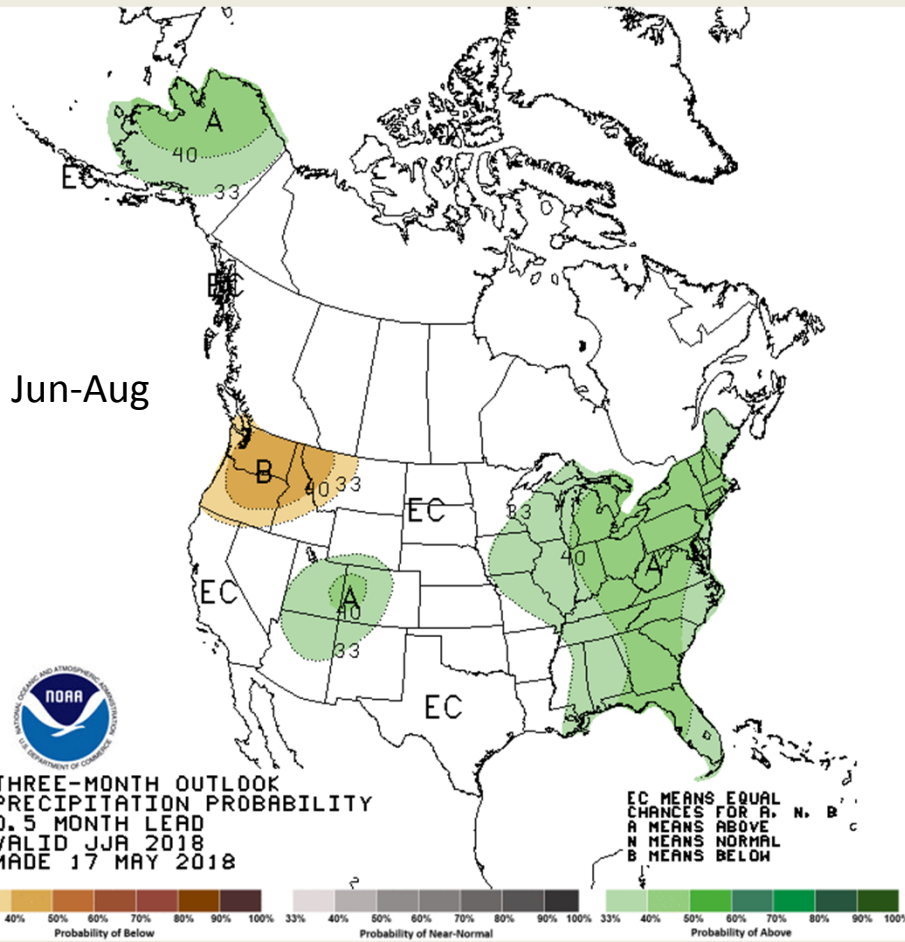
# U.S. Seasonal Temperature Forecasts



Source: NOAA/CPC



# U.S. Seasonal Precipitation Forecasts



Source: NOAA/CPC

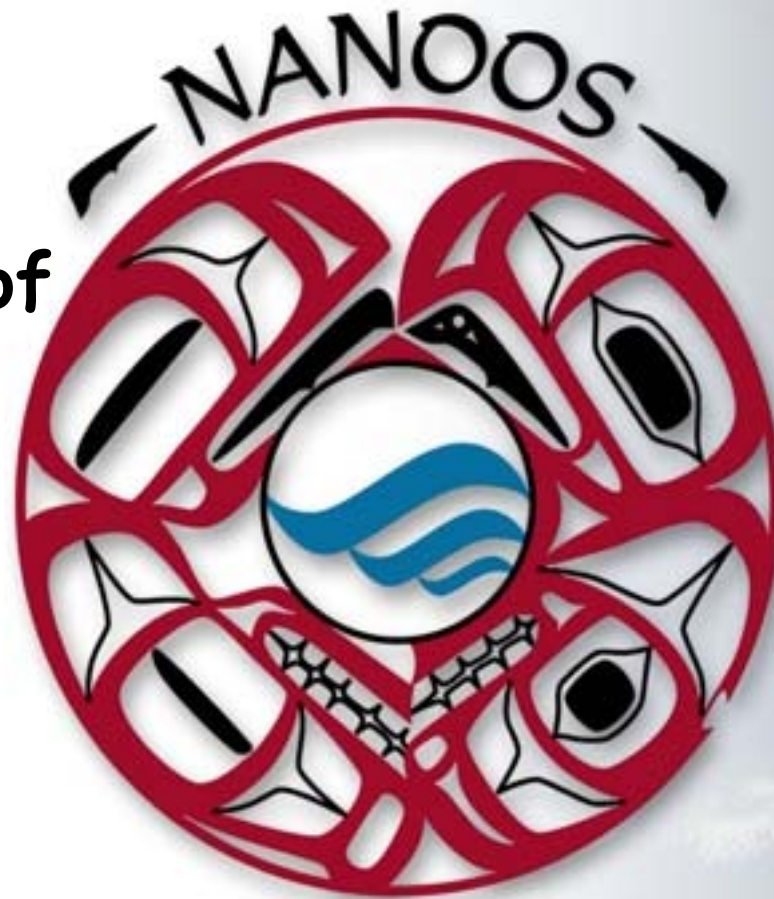
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# Northwest Association of Networked Ocean Observing Systems



**NOAA West Watch Update 22 May 2018:  
Washington / Oregon Observations**

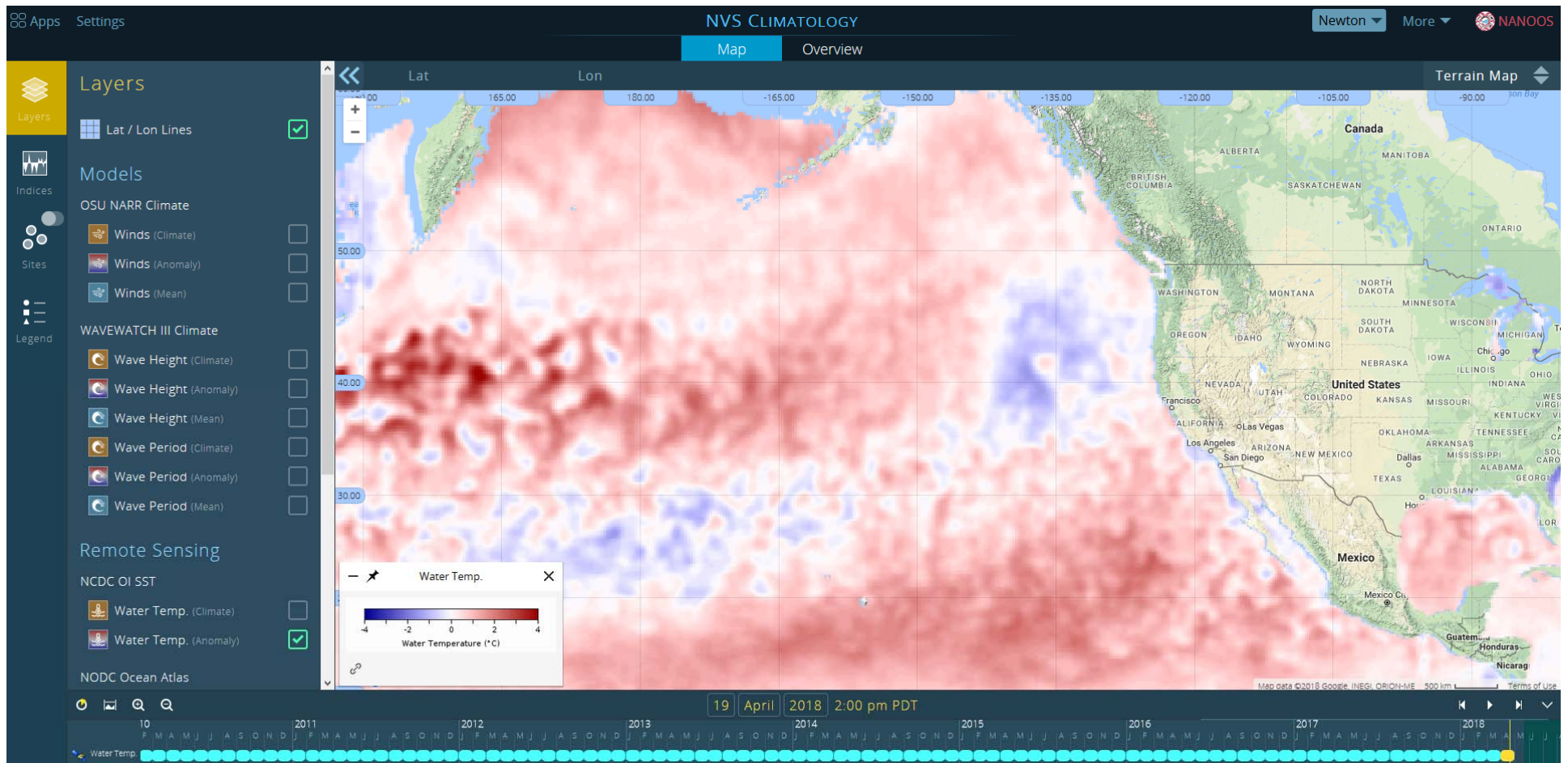
*Jan Newton, NANOOS Executive Director*



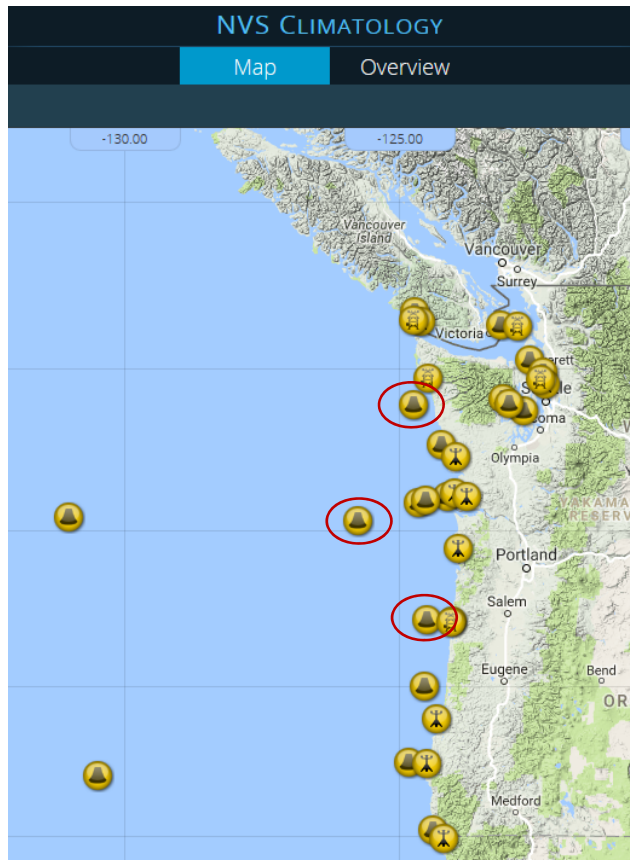
[www.nanoos.org](http://www.nanoos.org)

NANOOS: [www.nanoos.org](http://www.nanoos.org) Climatology app

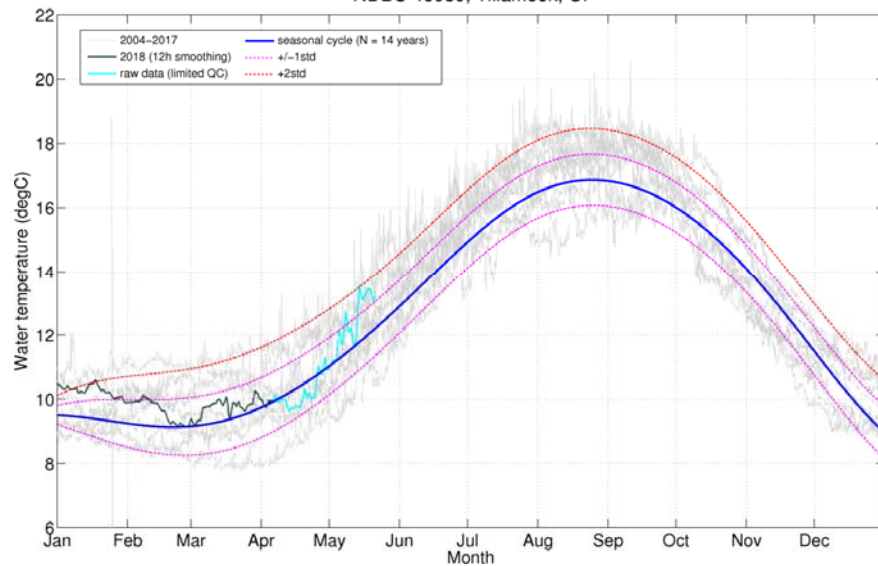
## Sea Surface Temperature Anomaly





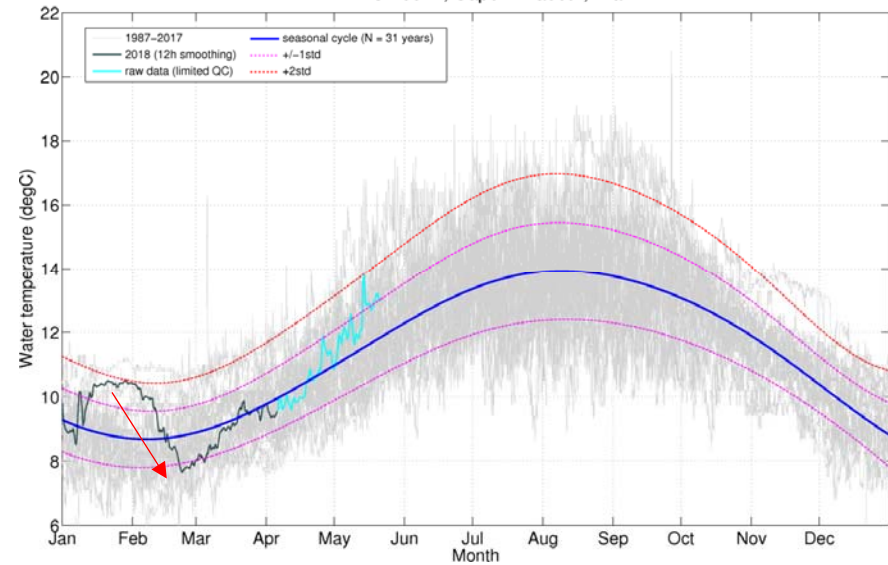


NDBC 46089, Tillamook, Or

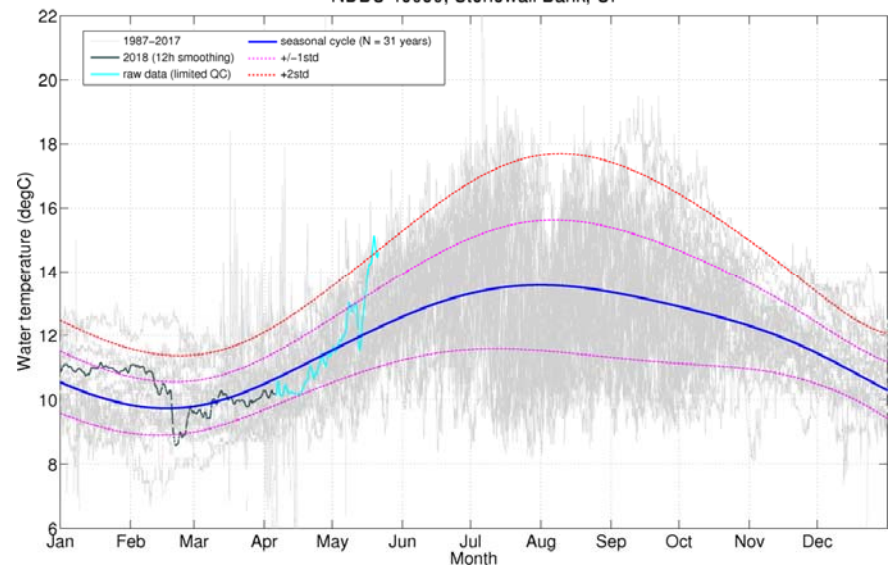


# Water Temp

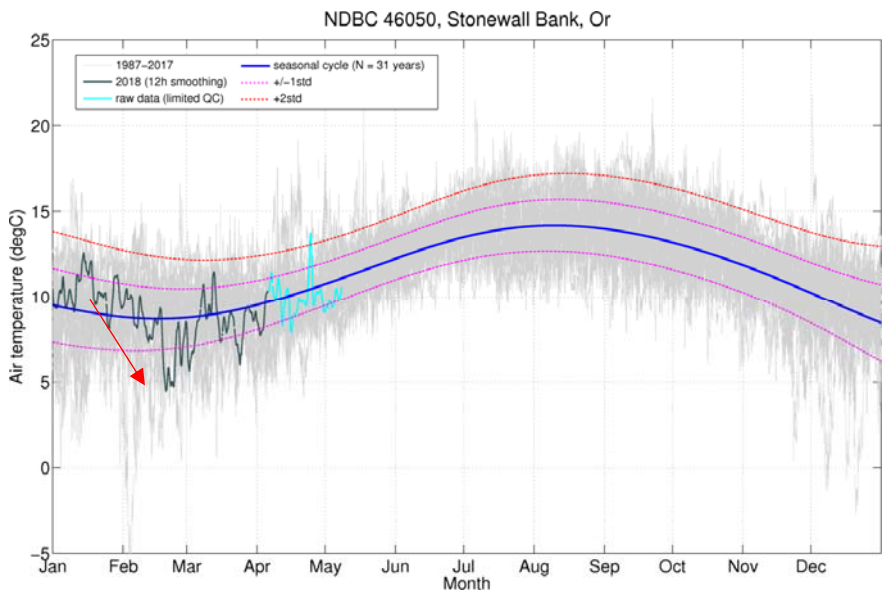
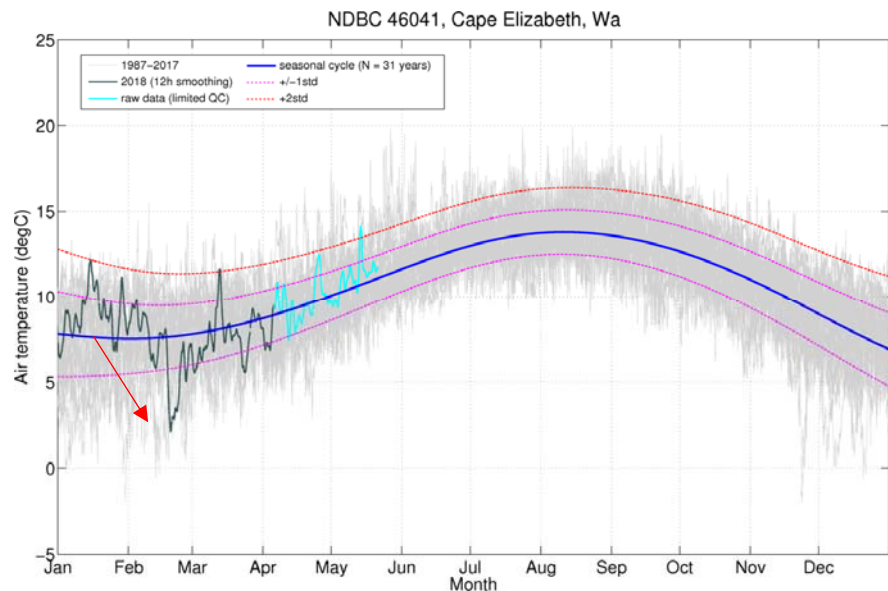
NDBC 46041, Cape Elizabeth, Wa



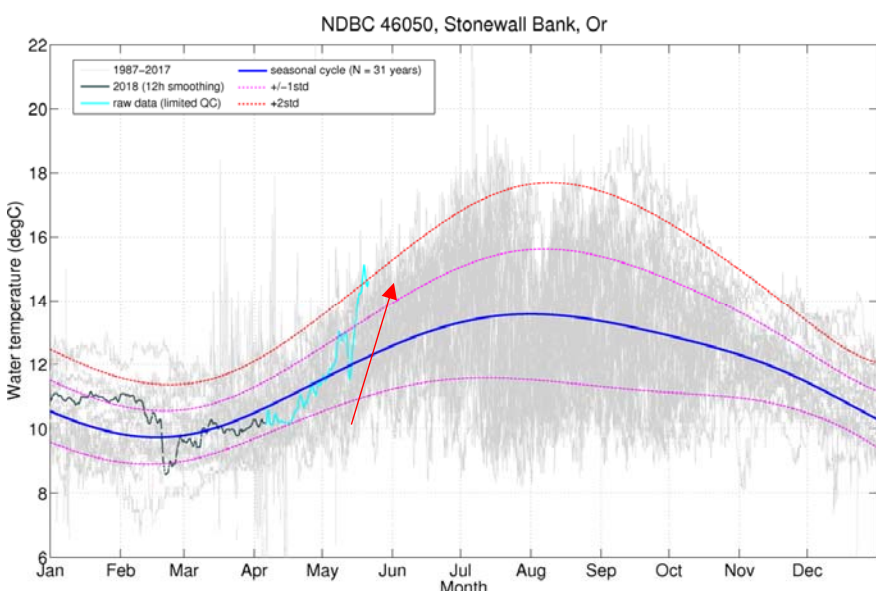
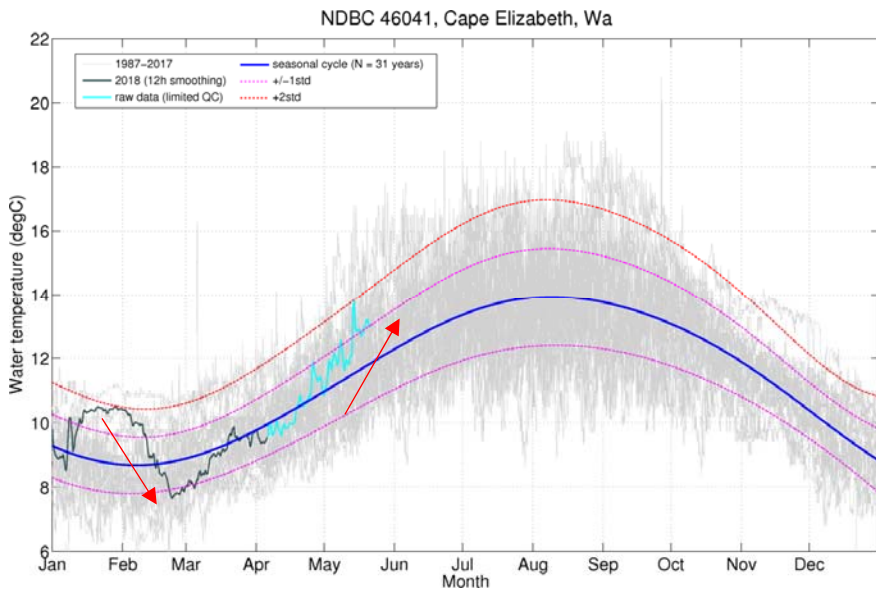
NDBC 46050, Stonewall Bank, Or

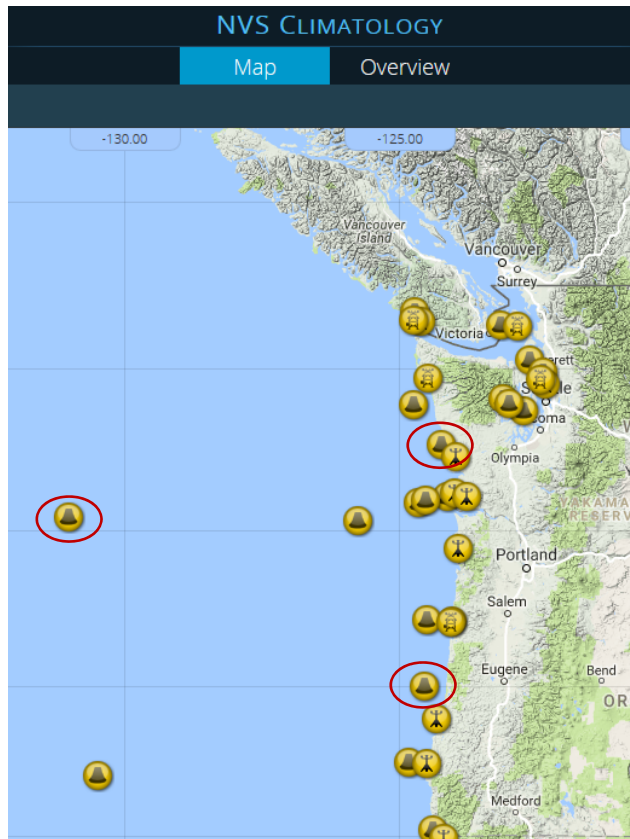


# Air Temp

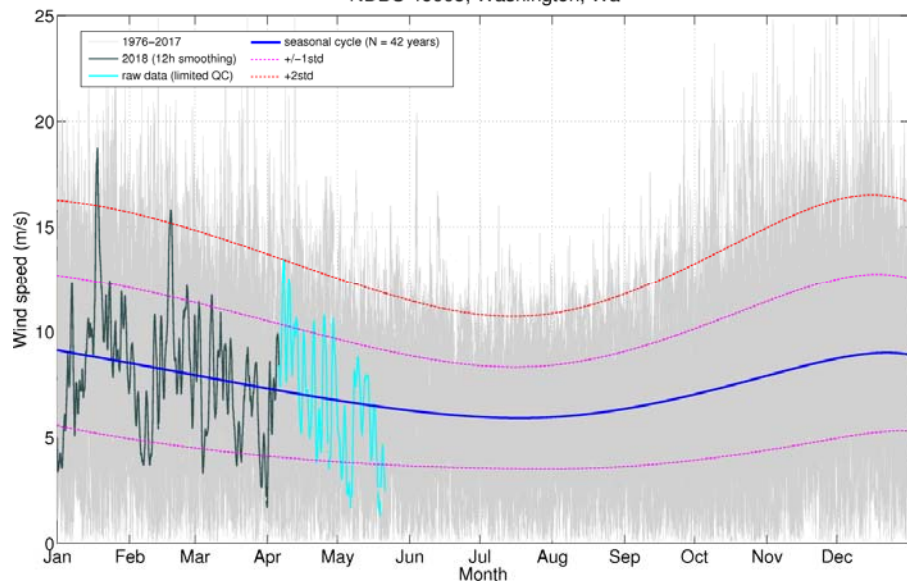


# Water Temp

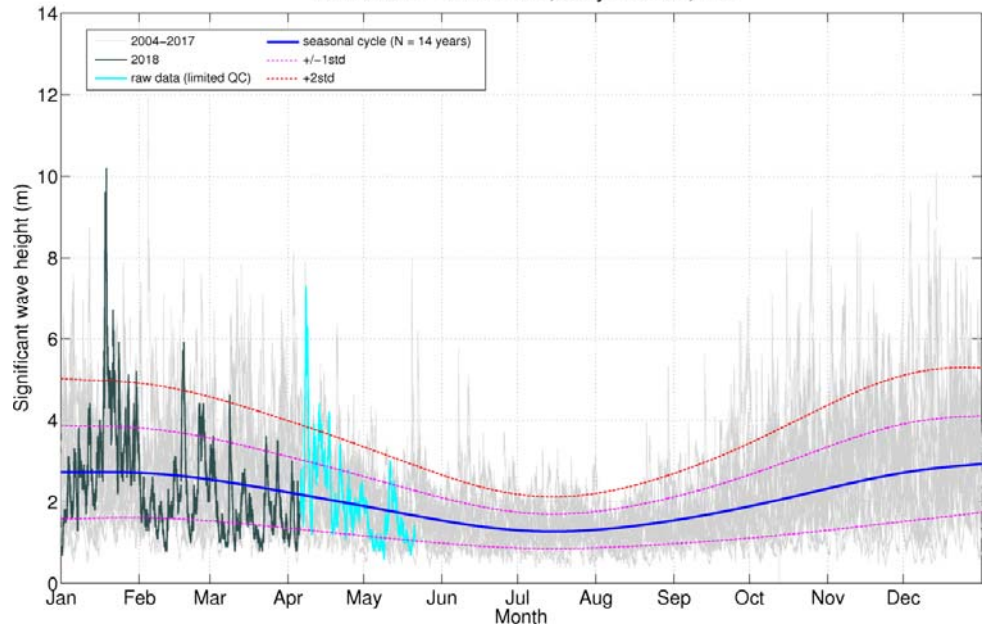




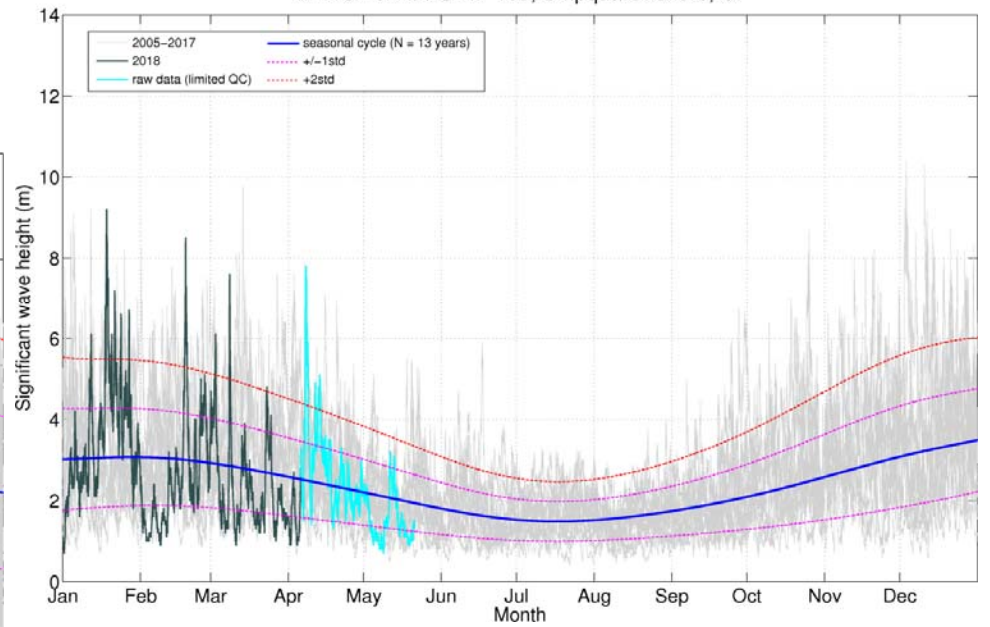
NDBC 46005, Washington, Wa



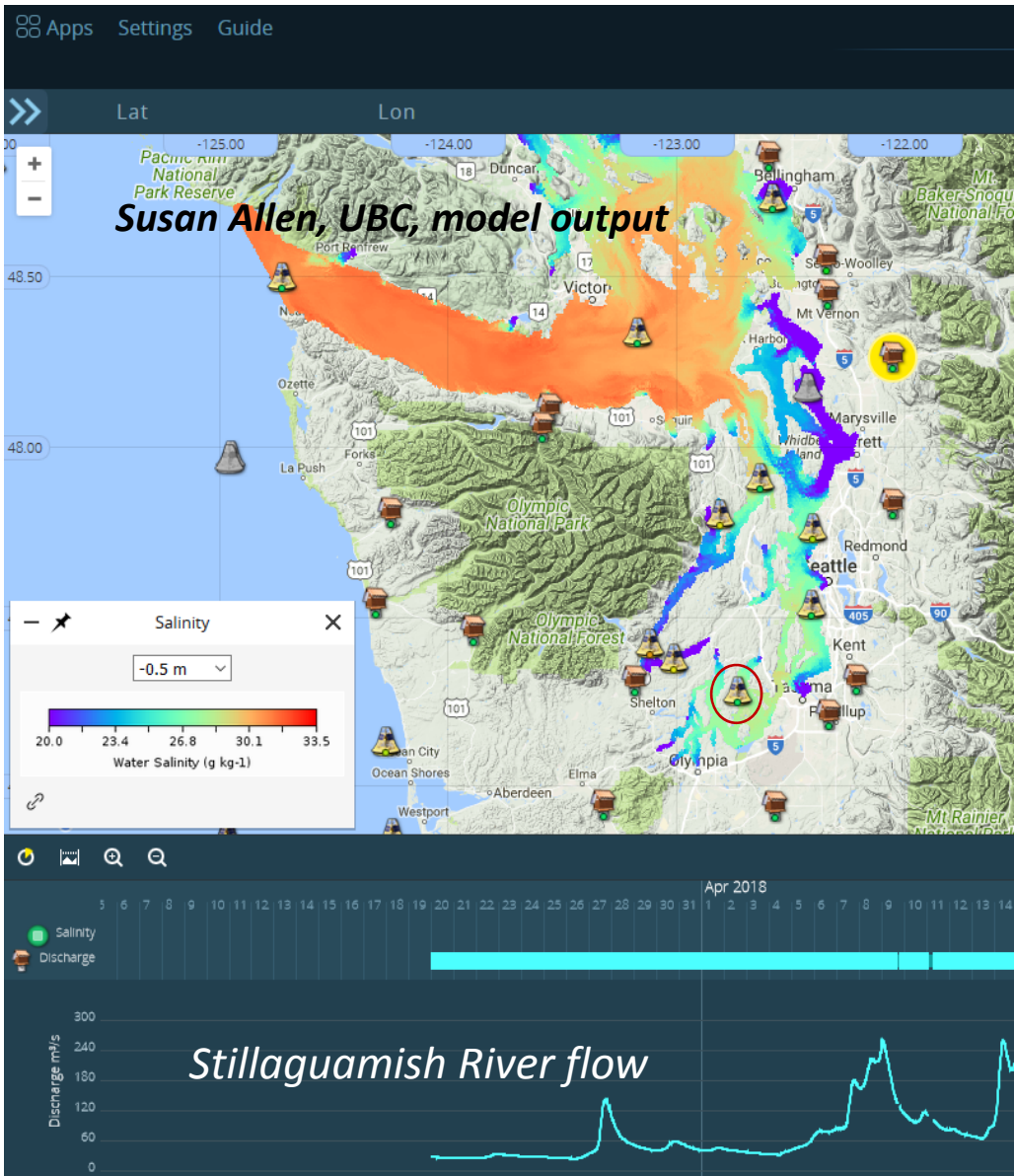
NDBC 46211 / CDIP 036, Grays Harbor, Wa



NDBC 46229 / CDIP 139, Umpqua Offshore, Or

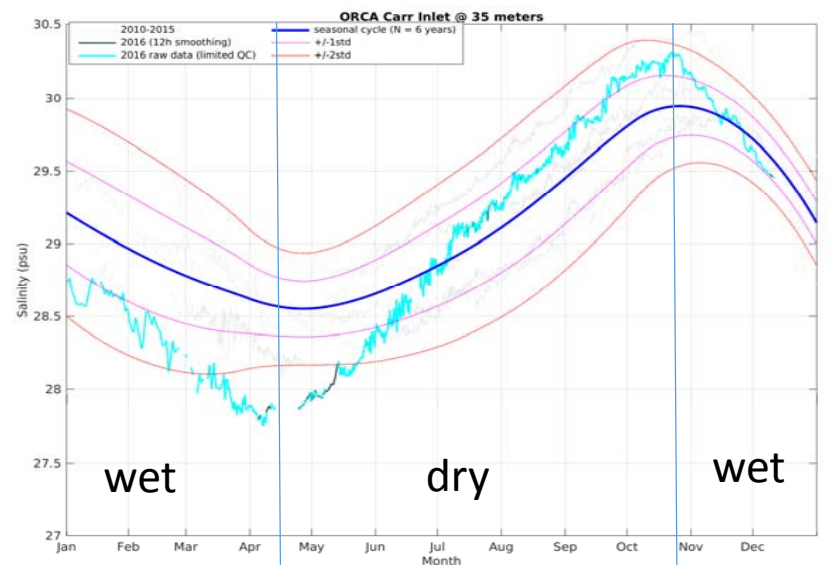
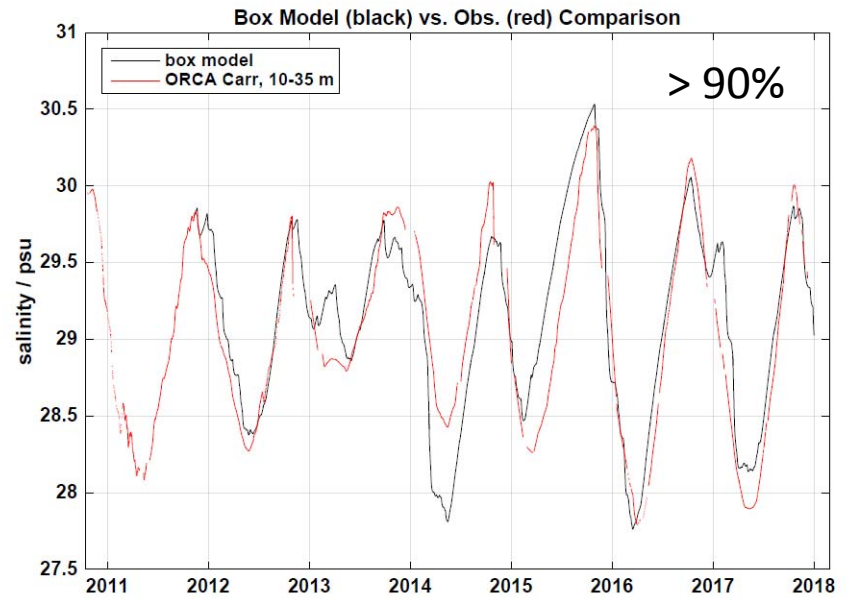






NVS DATA EXPLORER

Map Asset List





## *Strong atmospheric forcings:*

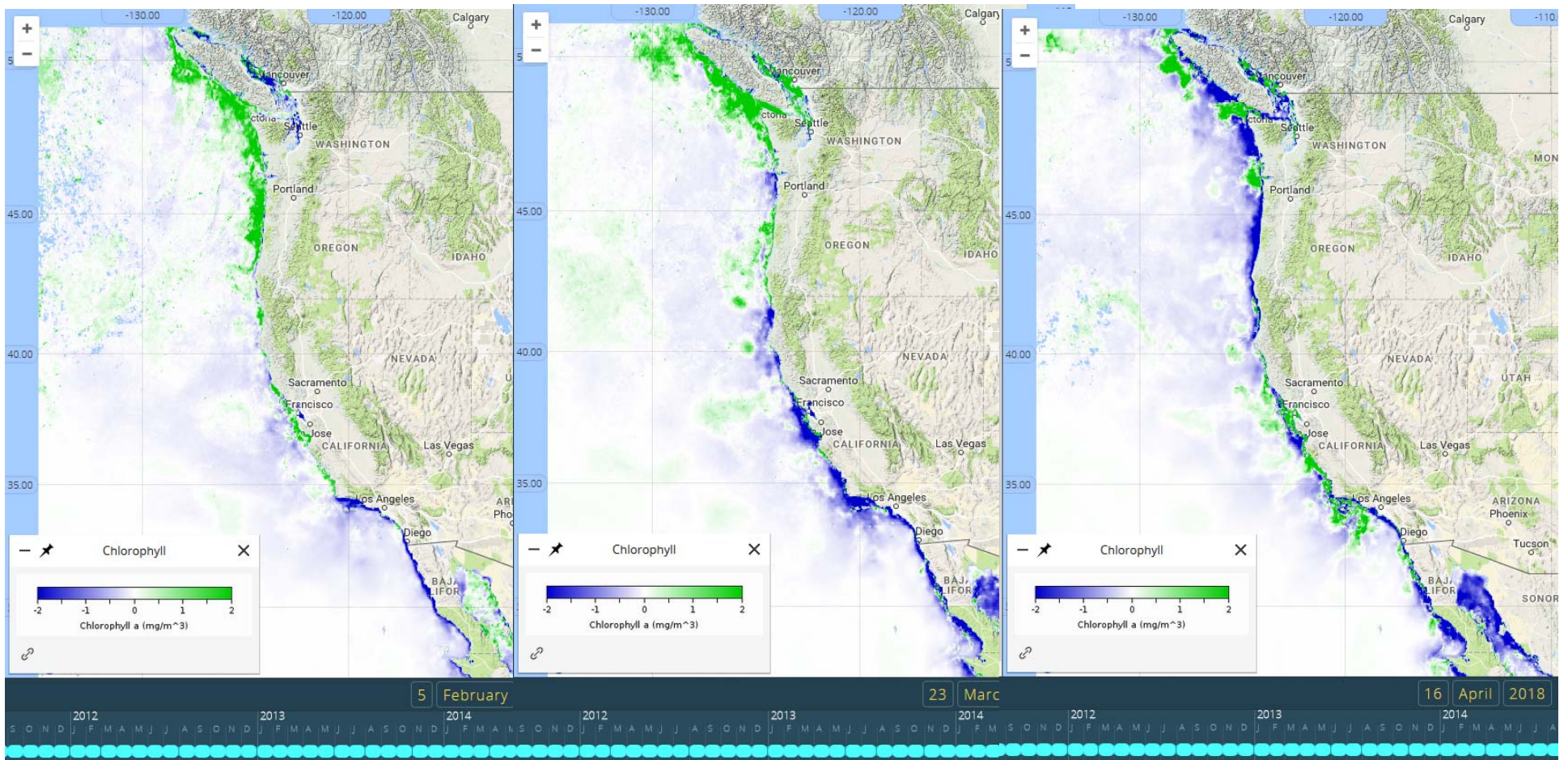
- Air temperature on surface water temperature
- Winds on wave height
- River flow on salinity

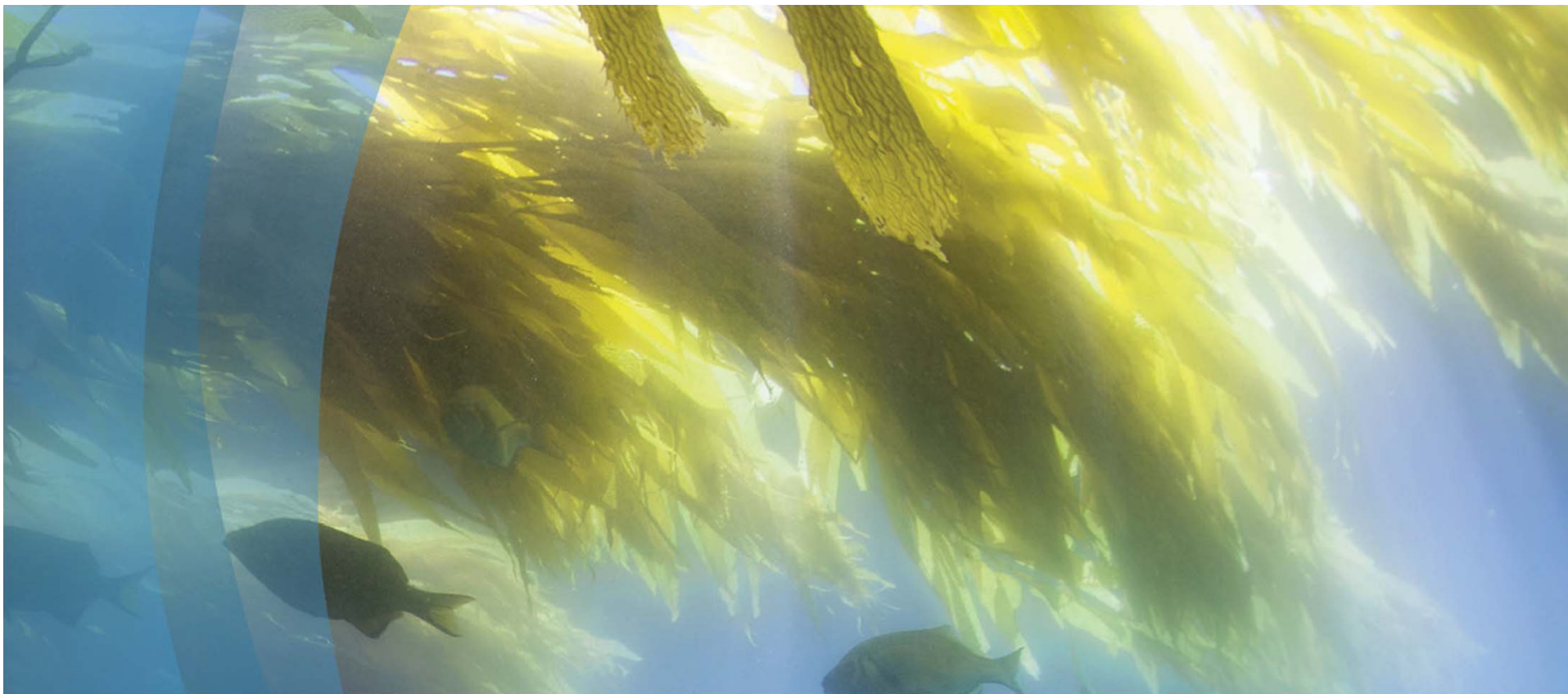
# Chlorophyll Anomaly

February

March

April





# NOAA West Watch Update: Central & Northern California Update

Presented by: Alex Harper, CeNCOOS Program Manager



# Climatology

The screenshot displays the NVS CLIMATOLOGY web application interface. At the top, there is a navigation bar with "Settings" on the left and "Map" and "Overview" on the right. Below this is a control bar with a "Wave Height (Climate)" toggle, a left arrow, and "Lat" and "Lon" labels. The main content area is divided into two columns. The left column contains three time-series line charts for "Eel River Buoy", "MBARI HL", and "Santa Maria Buoy", each showing data from January to May. The right column features three "Air Temperature" charts, each with a "Chart: Anomaly" dropdown and a "Time bin: weeks: Auto" dropdown, showing data from May 5, 2015, to May 18, 2018. Below these are "Water Temperature" charts, also with "Chart: Anomaly" and "Time bin: weeks: Auto" dropdowns, showing data from February 15, 2010, to May 16, 2018. A map at the bottom right shows the coastal region of California, with a blue triangle marker near Los Angeles. The bottom status bar displays "21 April 2018 9:00 am PDT".

Settings NVS CLIMATOLOGY

Map Overview

Wave Height (Climate) Lat Lon

Eel River Buoy

MBARI HL

Santa Maria Buoy

Air Temperature

Chart: Anomaly Time bin: weeks: Auto

Water Temperature

Chart: Anomaly Time bin: weeks: Auto

OSU MODIS Climate

- Chlorophyll (Climate)
- Chlorophyll (Anomaly)
- Water Temp. (Climate)
- Water Temp. (Anomaly)

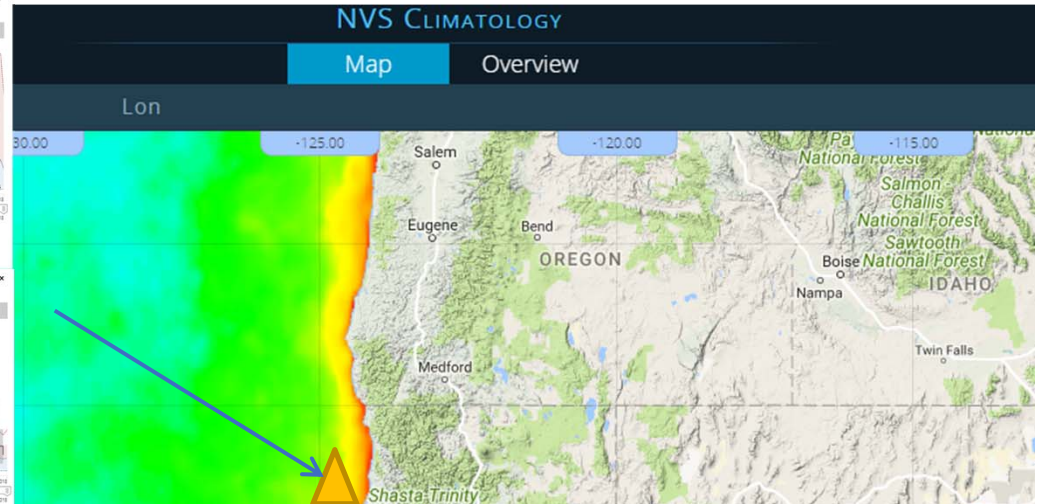
34.00

Water Temp.

Los Angeles Anaheim Beach Diego

21 April 2018 9:00 am PDT

# Chlorophyll in Northern CA??



OSU AVISO Climate

- Sea Level (Climate)
- Sea Level (Anomaly)

OSU MODIS Climate

- Chlorophyll (Climate)
- Chlorophyll (Anomaly)
- Water Temp. (Climate)
- Water Temp. (Anomaly)

36.00

34.00

Color scale for Chlorophyll concentration, ranging from 0 to 80. The scale is labeled 'Chlorophyll' and 'Chlorophyll in Region 1'.





# Atmospheric Marine Layer Returns

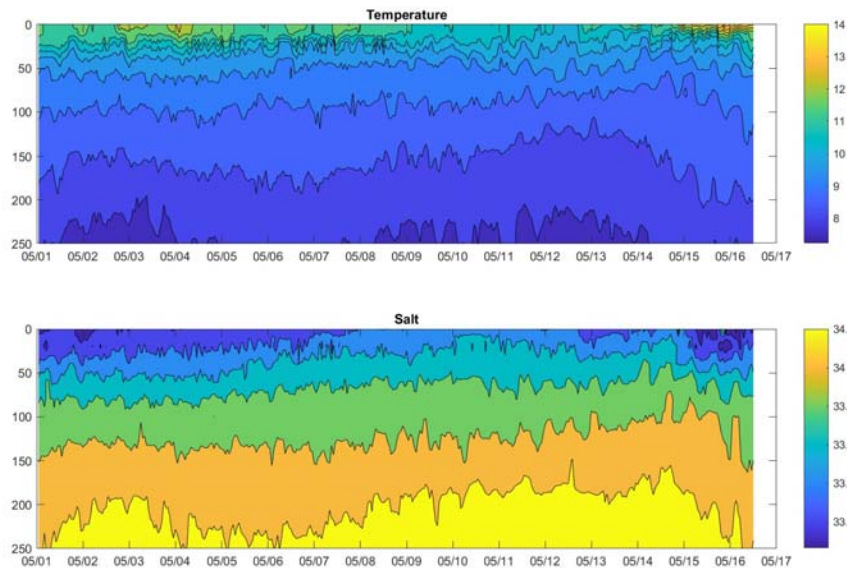
SFGATE LOCAL NEWS SPORTS REAL ESTATE BUSINESS A&E FOOD LIVING TR

## 'May gray' is here to stay, say San Francisco Bay Area forecasters

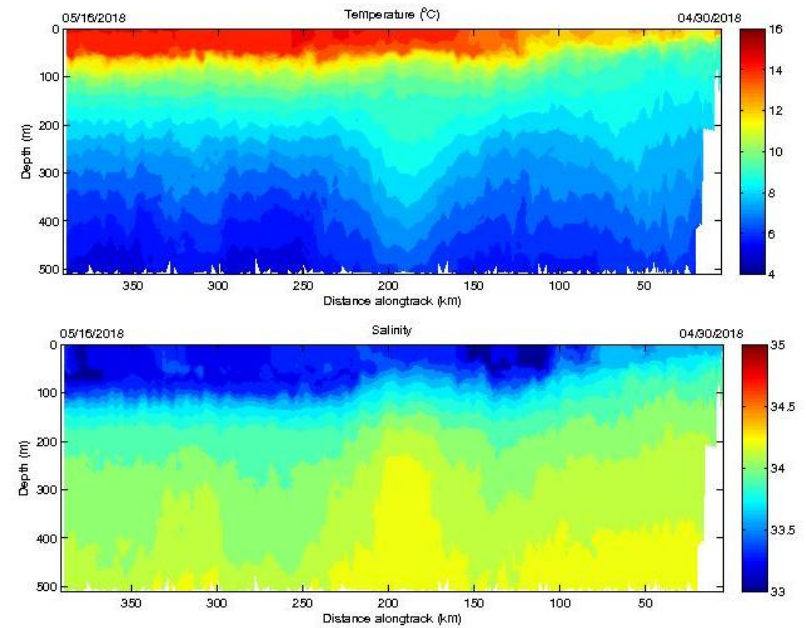
By Amy Graff, SFGATE Updated 9:57 am, Monday, May 14, 2018



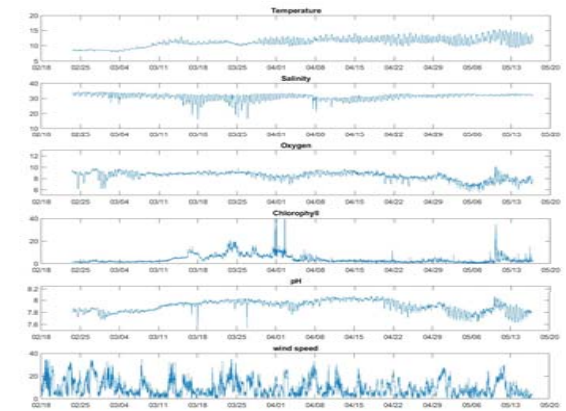
### Monterey Bay Mooring (M1)



### Monterey Bay Glider Line (67)



### Humboldt Shore Station (Chevron Dock)



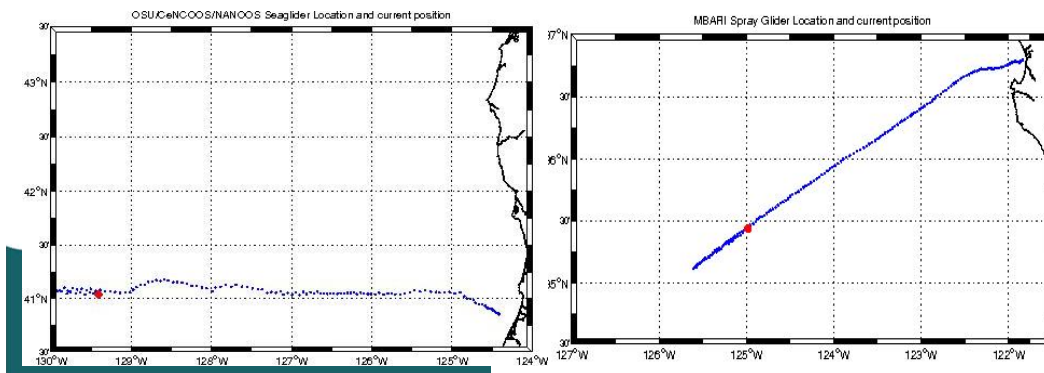
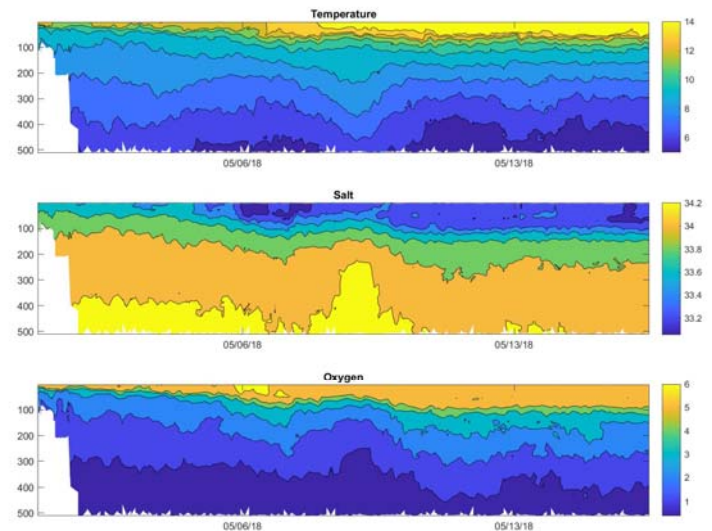
# CeNCOOS Glider Deployments

- Spray glider continuously along CalCOFI Line 67 and Sea Glider along Trinidad Head line
- Glider applications include: Climate/models, HABs, Biogeochemical cycles, Ocean acidification/hypoxia, Internal tides/sediment resuspension
- Glider deployment strategies: Continuous (lines – how long, grids – scale) Process experiments, Rapid response

Trinidad Head Glider Redeployment



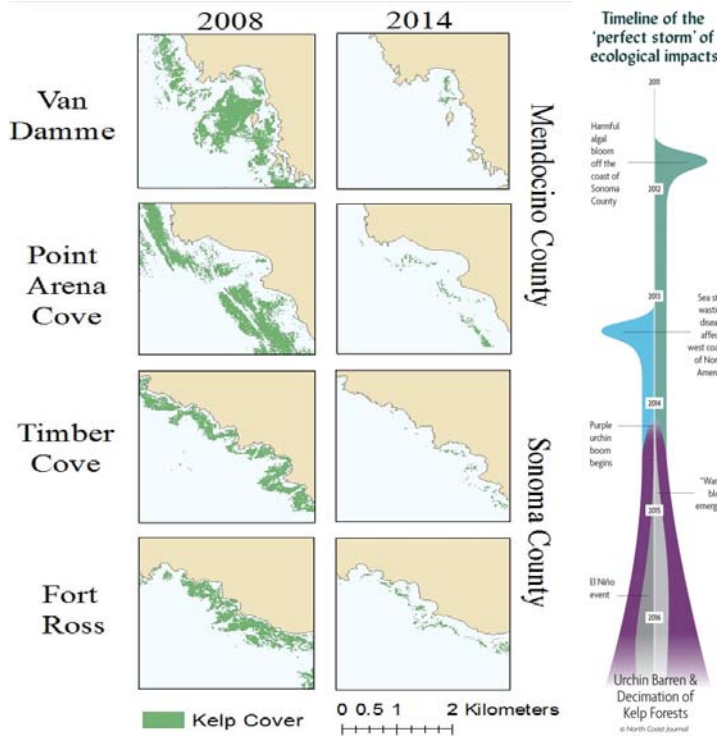
Monterey Bay Glider Line (67)





# Biology & Ecology Update

## Kelp, urchins, and whales



4-MINUTE READ

### How music led Daniel DeLeon to study the ocean with machine learning

Daniel didn't know what engineering was when he started community college. Now he's making breakthroughs, using machine learning to track endangered whales.



MBARI using machine learning to classify marine mammal calls from deep sea observatory hydrophone.

[google.com/about/stories/soundwaves/](https://google.com/about/stories/soundwaves/)

SFGATE LOCAL NEWS SPORTS REAL ESTATE BUSINESS A&E FOOD LIVING TRAVEL OBITUARIE

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### Check out these insanely close photos of killer whales in Monterey Bay

By *Alix Martichoux*, SFGATE Updated 7:24 am, Wednesday, May 16, 2018

✉ f t p g+







# Questions?

Email Alex Harper at [aharper@mbari.org](mailto:aharper@mbari.org)



# ACIDD: Across the Channel Investigating Diel Dynamics



Co-PIs Kelsey Bisson and Nick Huynh, UCSB



California wildfires  
December 5th, 2017 - Mixed natural color-NIR/SWIR view, enhanced contrast and saturation  
Terra MODIS data through NASA Worldview  
Processed by Pierre Markuse

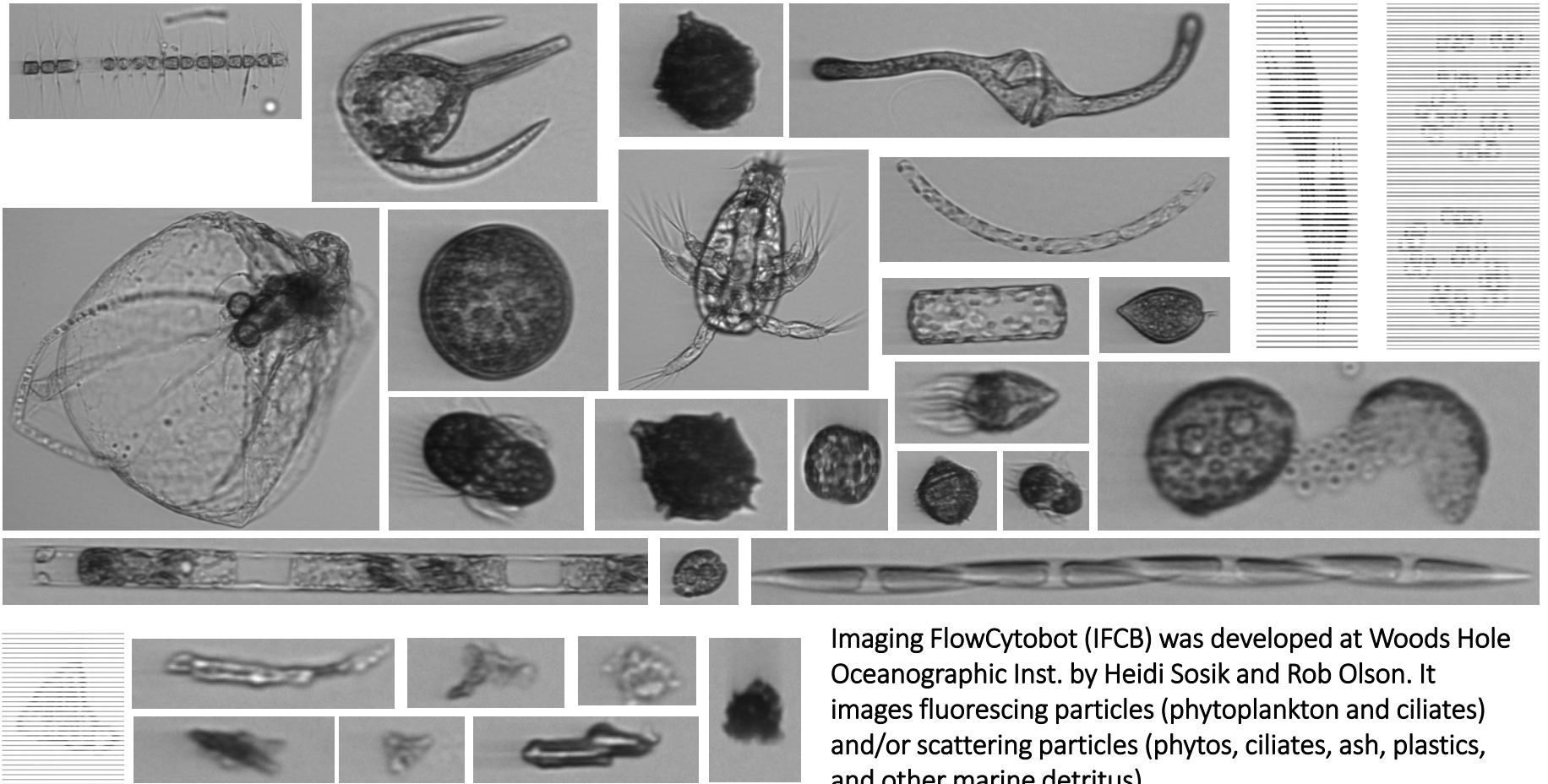
Thomas Fire Smoke Plume, 5 Dec 2017



R/V Sally Ride



# Imaging FlowCytobot: phytoplankton, ciliates, & ash

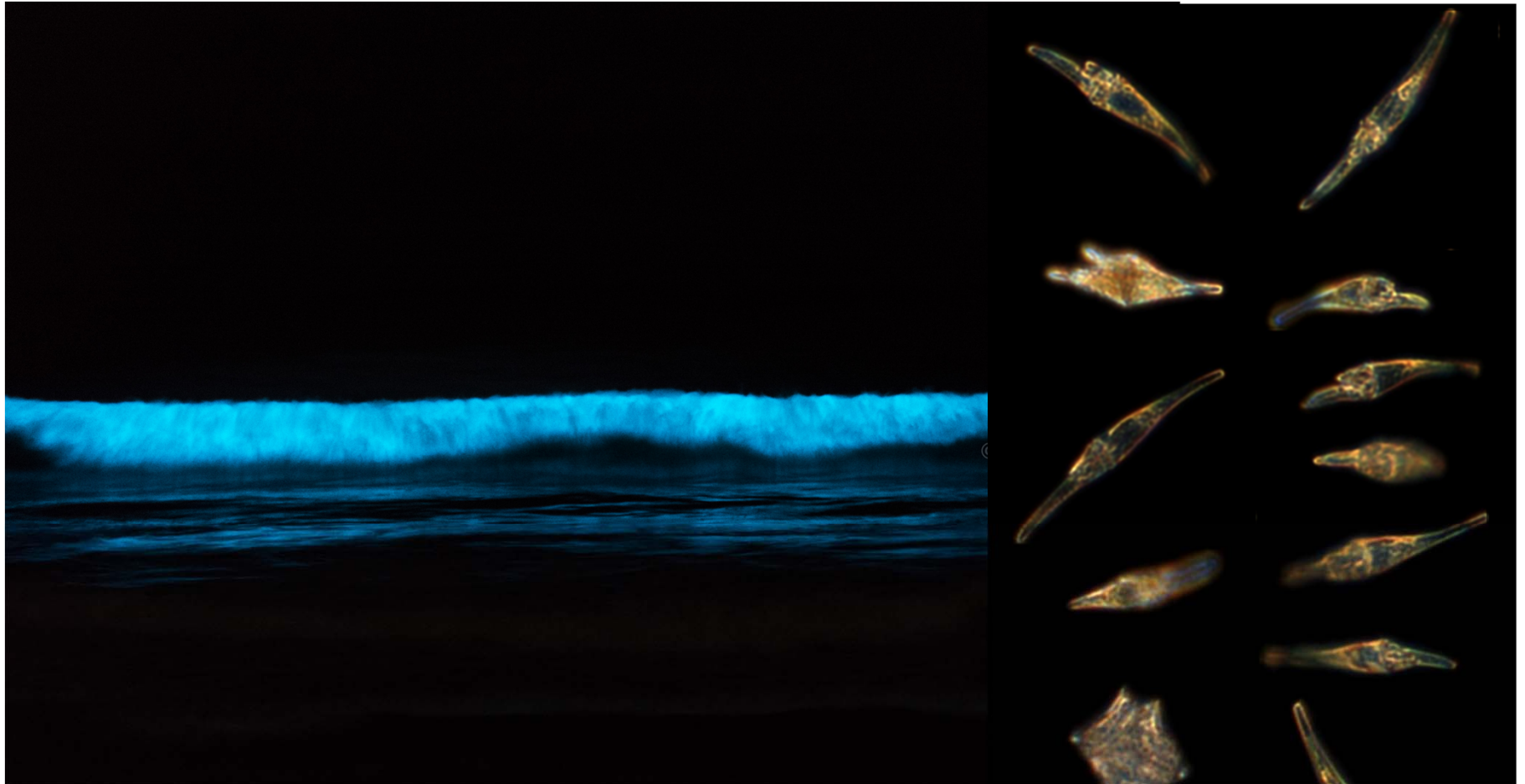


Imaging FlowCytobot (IFCB) was developed at Woods Hole Oceanographic Inst. by Heidi Sosik and Rob Olson. It images fluorescing particles (phytoplankton and ciliates) and/or scattering particles (phytos, ciliates, ash, plastics, and other marine detritus).



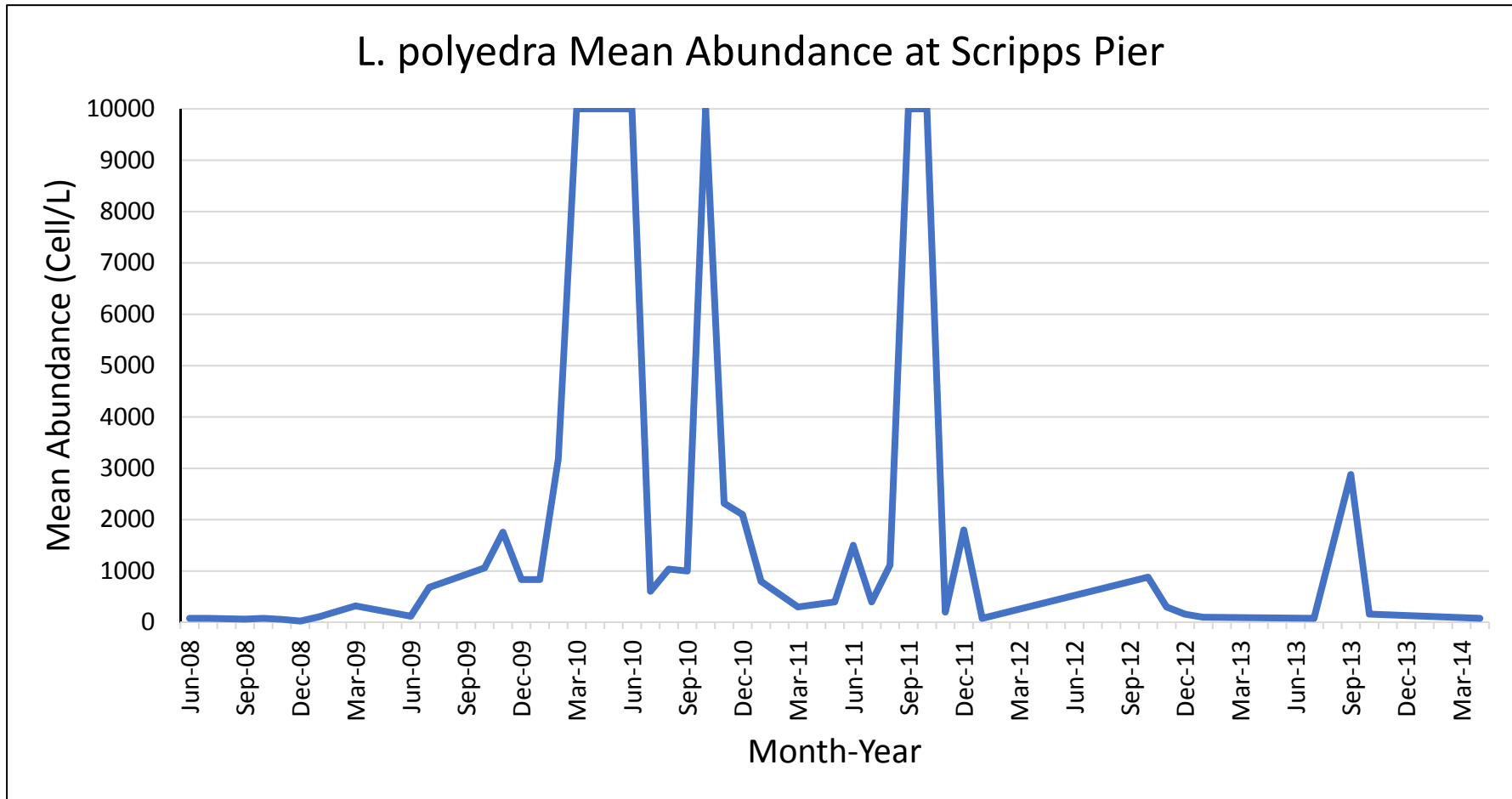
Kelsey Bisson &  
Sasha Kramer  
(IGPMS)

# Red Tide – La Jolla, May 7<sup>th</sup> 2018





# *Lingulodinium polyedra*



# Sick Pelicans – Pepperdine University, April 28, 2018



# Call Agenda

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- Project Recap & Updates (Polly Hicks)
- El Niño and Regional Climate brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Jan Newton, Alex Harper, Megan Hepner)
- **Environmental conditions and impacts reporting and discussion (Polly Hicks)**
- Discussion



# Regional Impacts Summary

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## Reporting Status:

- 73 entries since March 21, 2018

## Environmental Conditions

- Drought
- Water Allocations
- Flooding
- Severe Weather
- Record High Temperatures
- High Ozone Levels
- Snowfall Records
- Vog
- Wildfire

## Human & Environmental Impacts

- Property damage/Loss of property
- Impacts to recreational access
- Evacuations
- Increased human health risks
- Power outages
- Agriculture
- Loss of livestock
- Water Restrictions

# Impacts in Pictures



Two EF-0 tornados touched down in Colusa County, California. One in the town of Williams left a 1-mile long damage track. Six homes were damaged along with reports of damage from flying debris. The tornados were part of a strong atmospheric river that swept through California causing flooding, road closures, airport delays and cancelations, and rockslides in Northern California.



Photo: CHERI ROSS



Photo: SEAN MATTSON

# Impacts in Pictures



Unprecedented rainfall and landslides forced water rescues and strand entire towns on Kauai where water rose 5-8 feet due to severe thunderstorms and flash flooding. Wainiha broke their 24 hour rainfall total by almost 3 inches at 19.54 inches. Hanalei saw 28.15 inches in 24 hours. Two homes were torn from their foundations with many others flooded. Sarah Blane, chief of staff to Kauai's mayor said "It's the worst natural disaster to occur on Kauai in 25 years, since Hurricane Iniki."

An Extremes Committee is being convened to evaluate the observation of 49.69 inches of rain in 24 hours in Waipa, Kauai on April 14-15 as a new US 24-hour record. The standing record is 43 inches observed at Alvin, Texas in 1979 during Tropical Storm Claudette.





# Impacts in Pictures



Drought conditions in the panhandle of Alaska are showing up on the US Drought Monitor due to a winter of below-average snowfall, a dry autumn, and early spring. This is unusual because the area is located in the world's largest temperate rainforest. Ketchikan was running 30-40 inches of rain below normal. This lack of precipitation can impact hydropower, water supplies and snowpack. In March, the City of Wrangell was forced to implement water restrictions because the city was down to about a one month's supply at one point in time.



[https://commons.wikimedia.org/wiki/File:Ketchikan\\_Alaska\\_Panoramic.jpg](https://commons.wikimedia.org/wiki/File:Ketchikan_Alaska_Panoramic.jpg)

# Impacts in Pictures



Gov. Jay Inslee declare a state of emergency Saturday for 20 counties throughout Eastern Washington due to rain and severe snowmelt flooding. He said "Flooding caused by recent rains and snowmelt has fouled water and sewage treatment facilities, threatened state highways and local roads, and caused some people to leave their homes"

Authorities told residents in the town of Leavenworth to prepare for evacuations as a dam is threatened by rising waters. About 50 homes are threatened.





# Impacts in Pictures

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Record snowfall in parts of Northern Montana has begun to melt and is causing very high river levels along the Clark Fork River in Missoula, Montana. So far, the river has risen to major flood stage at its highest levels since 1908. The river has receded some but further rises are expected. Because of this, 800 people remain under evacuation notice. The river has since been closed to recreation due to downed power lines and other debris.



Water from the Clark Fork River floods onto Tower Street in Missoula, May 7, 2018  
Josh Burnham, Montana Public Radio



# Call Agenda

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- Project Recap & Updates (Polly Hicks)
- El Niño and Regional Climate brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Jan Newton, Alex Harper, Megan Hepner)
- Environmental conditions and impacts reporting and discussion (Polly Hicks)
- **Discussion (all)**
  - Additional impacts to report?
  - Observations on recent environmental anomalies?

**Next NOAA West Watch: July 24<sup>th</sup>, 1-2pm PDT/ 2-3pm PDT**