

NOAA West Watch

Reporting Regional Environmental Conditions & Impacts in the West

January 23, 2017

Call Agenda

- Project Recap & Updates (Ruth Howell)
- El Niño and Regional Climate brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Jan Newton, Aric Bickel, Clarissa Anderson)
- Environmental conditions and impacts reporting and discussion:
  - Media (Ruth Howell)
  - Others
- Discussion

Regional Coordination Goals

1. Document and share environmental conditions information and impacts on human systems and NOAA mission at the regional scale.

2. Improve awareness of environmental observations and human system impacts across NOAA mission lines.

3. Improve regional communication and coordination across NOAA mission lines and between NOAA and NOAA-funded regional partners involved in monitoring and communicating changing climate conditions and impacts.

4. Improve external communication of regional impacts from changing environmental conditions, including but not limited to El Niño. Target audience is regionally connected elected officials and representative groups (e.g., WGA)



Regional Coordination Action Plan

New: Bi-Monthly webinars

- Brief on regional climate conditions/forecast and discuss deviations from "normal".
  - NWS, NESDIS and OAR report on terrestrial observations;
  - NMFS and NOS report on coastal and marine observations; and
  - Partner network observations (WRCC, IOOS, RISA, Sea Grant, etc)

- Exchange information on terrestrial and coastal-marine impacts

Bi-Monthly communication

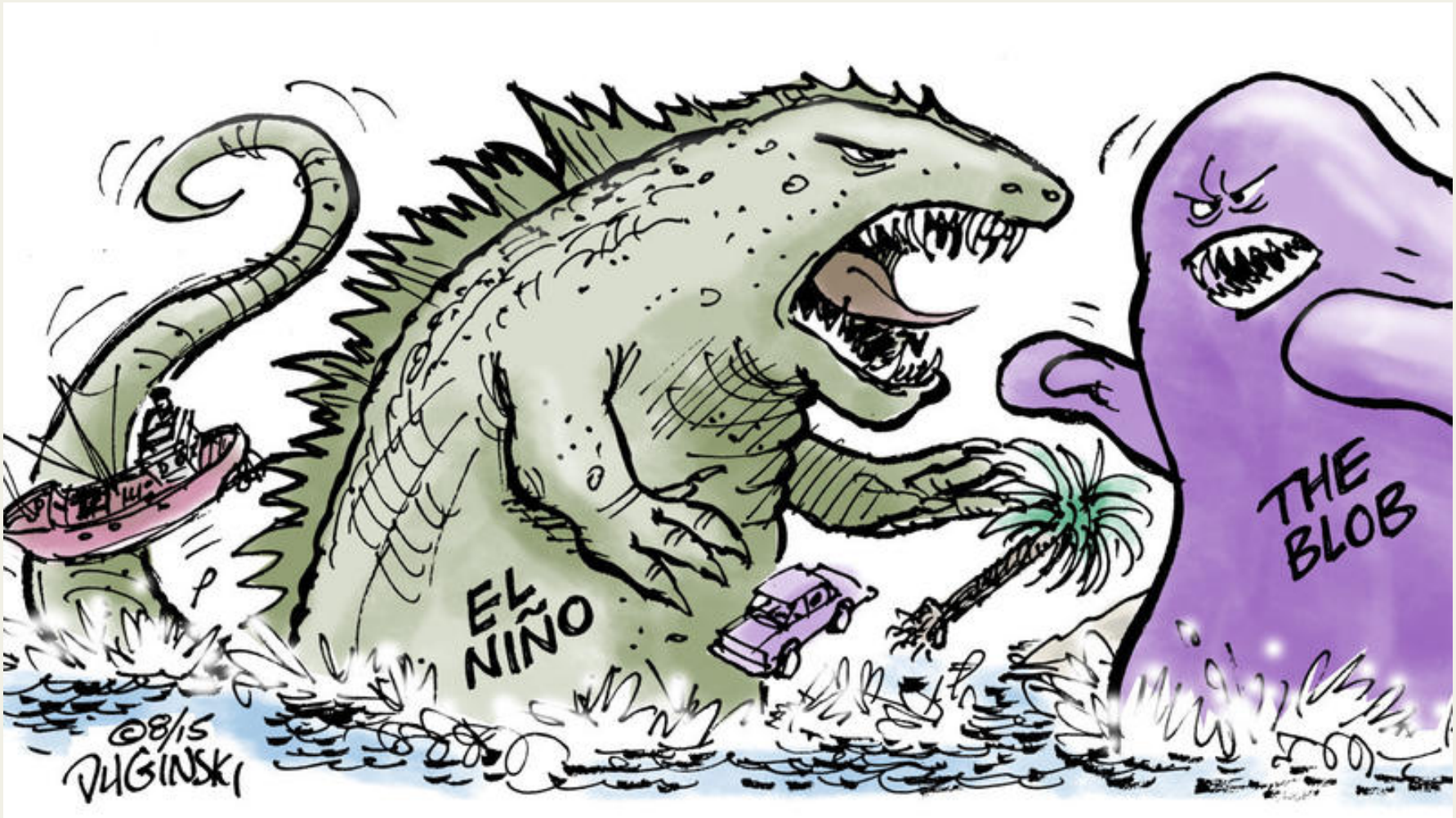
- Information will enrich existing products such as the State of the Climate monthly summaries
- Communication to in-region elected officials (in coordination with NOAA OLIA).

Documentation

- Regionally specific updates and observed changes in the terrestrial and coastal and marine environments (as informally reported) will be summarized at the projects end.
  - The summary will informally characterize changing environmental conditions and impacts over the NOAA West Watch project period.
  - The summary will not include attribution of impacts, but could serve to inform a retrospective analysis of the human system impacts of environmental phenomena – including ENSO.

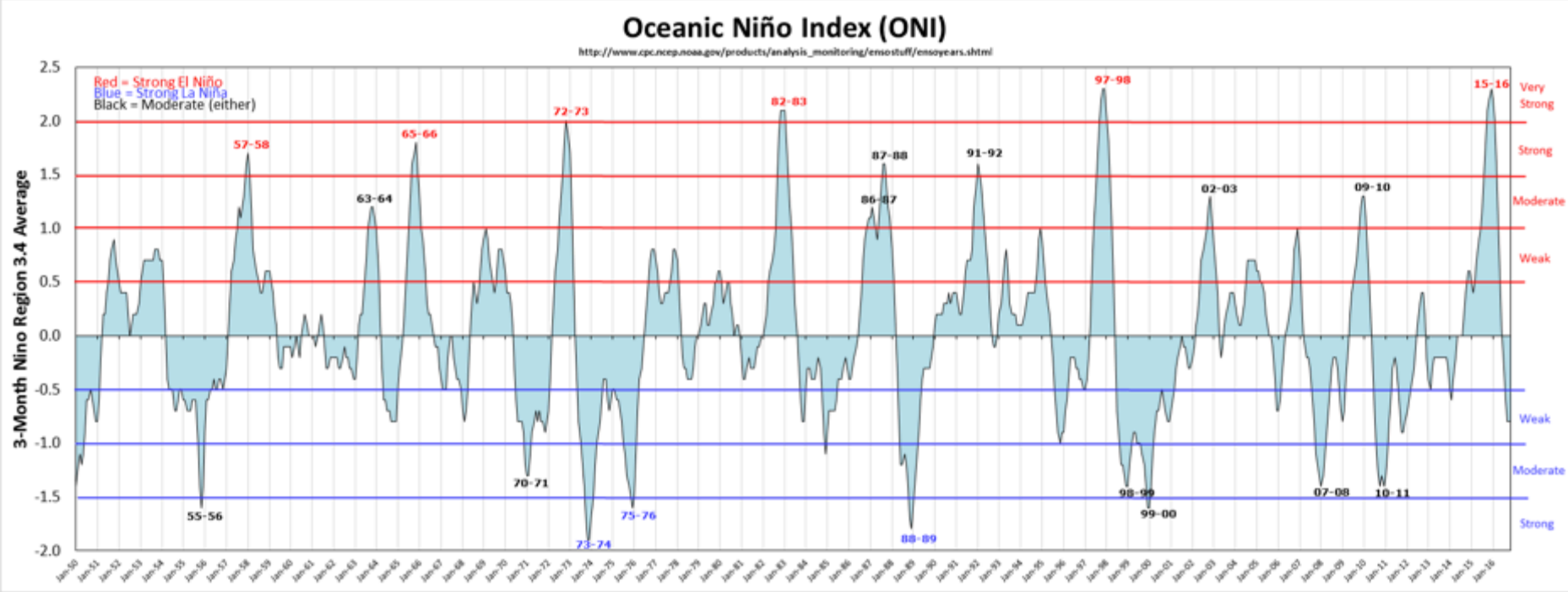
Climate Brief: Dan McIvoy, WRCC

2015/2016 Water Year Recap



Credit: LA Times, Paul Duginski

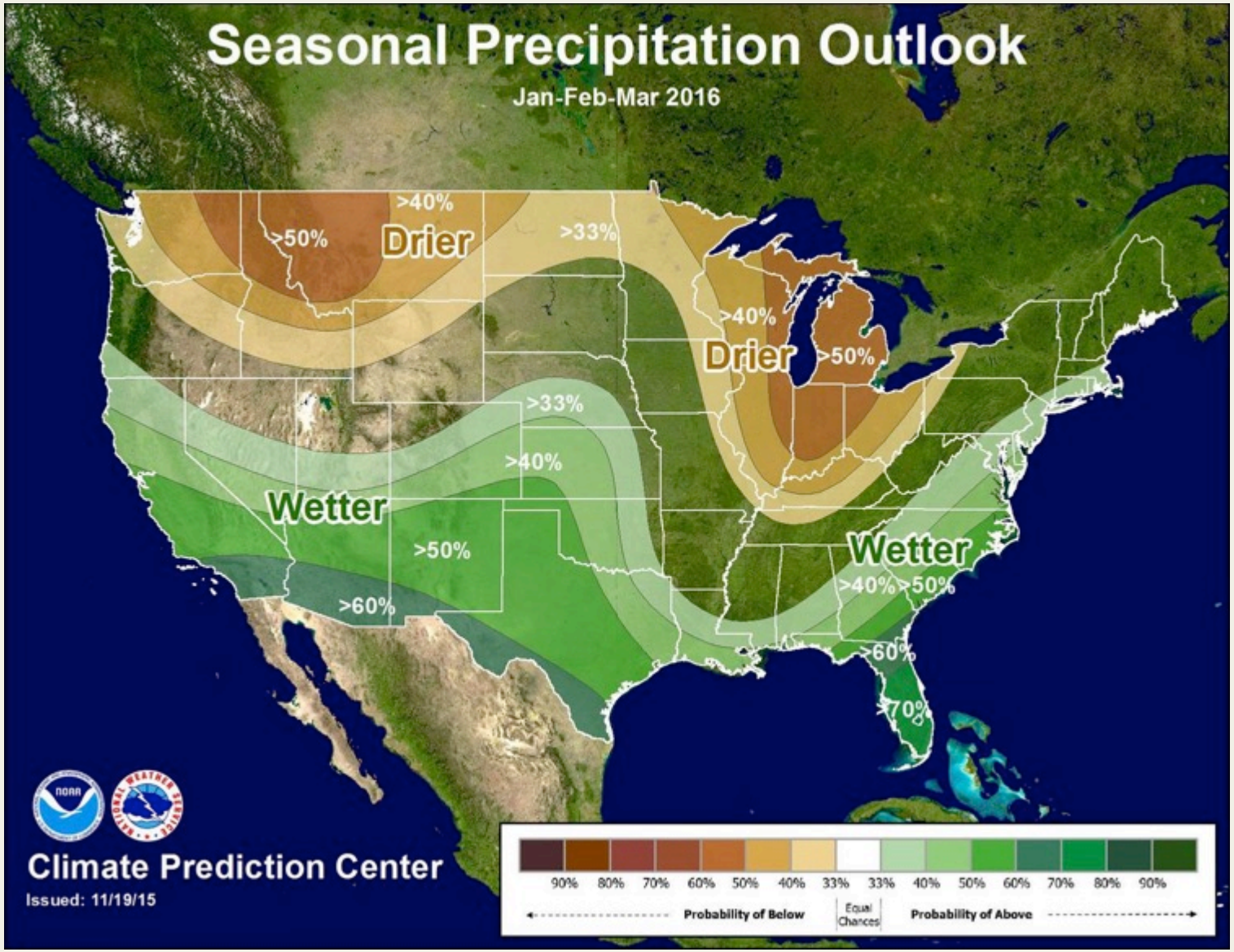
2015/2016 Water Year Recap



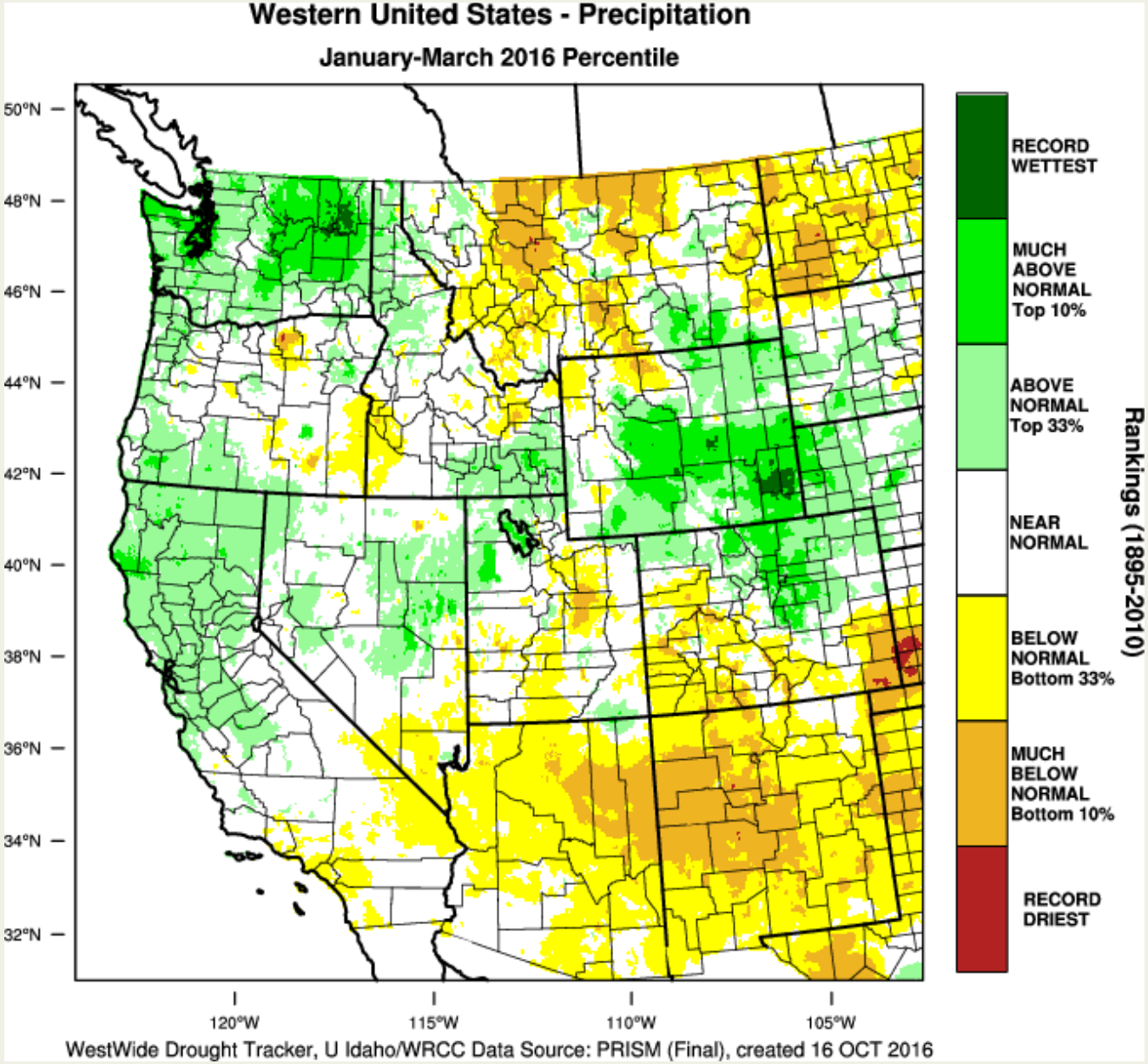
- 2015/16 was one of the top three strongest El Niño's on record, depending on what index you look at

Source: http://ggweather.com/enso/oni.htm

2015/2016 Water Year Recap

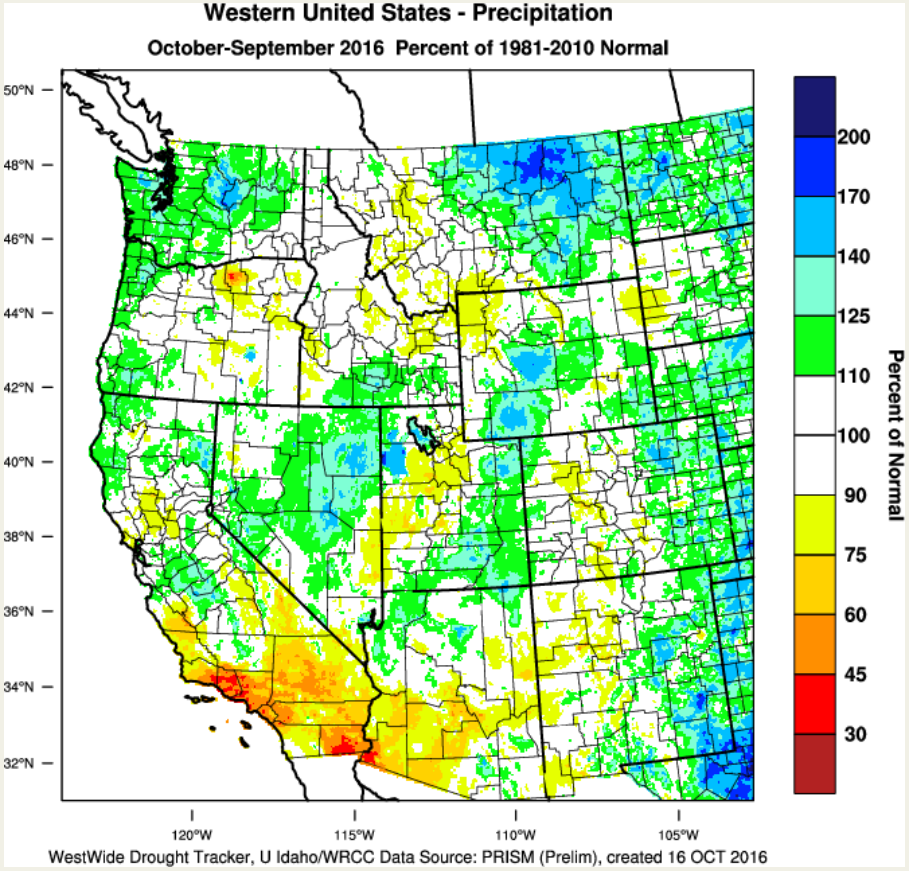


2015/2016 Water Year Recap

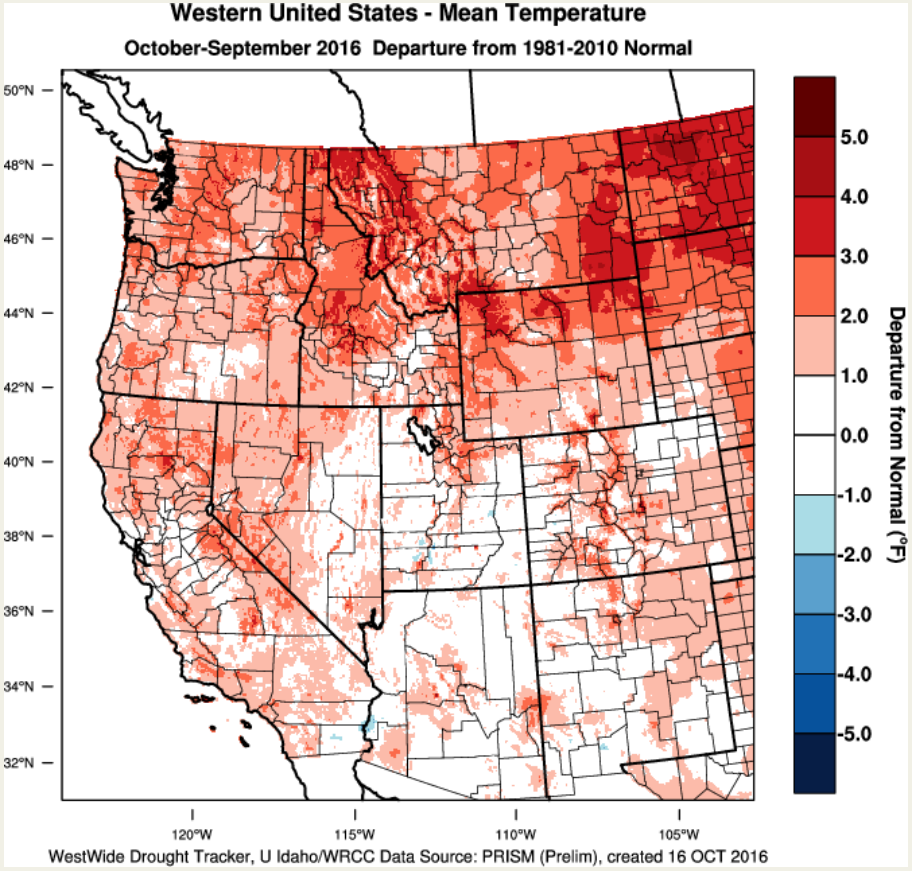


2015/2016 Water Year Recap

Precipitation % of normal



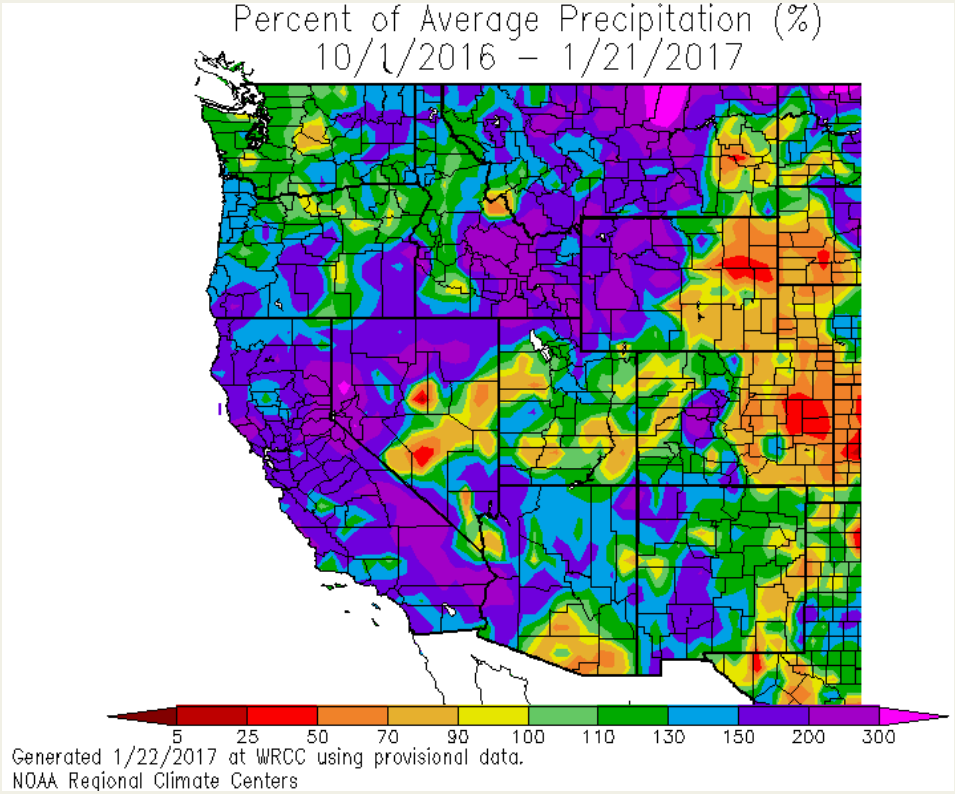
Temperature Anomaly



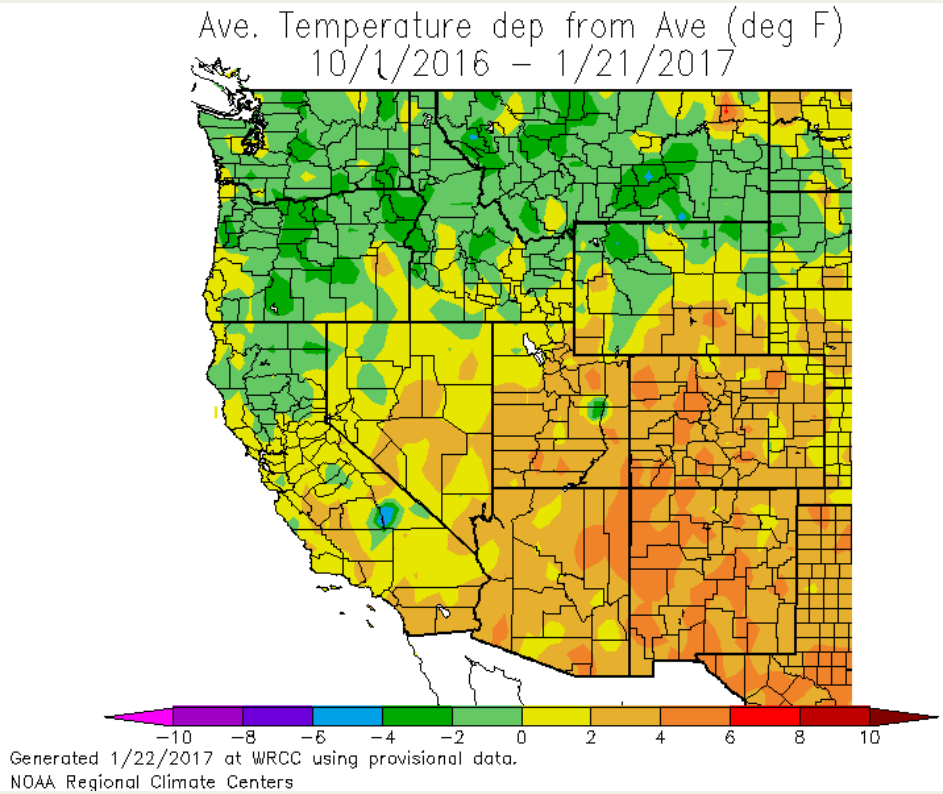
2016/2017 Water Year Update

Oct 1, 2016 – Jan 21, 2017

Precipitation % of Normal

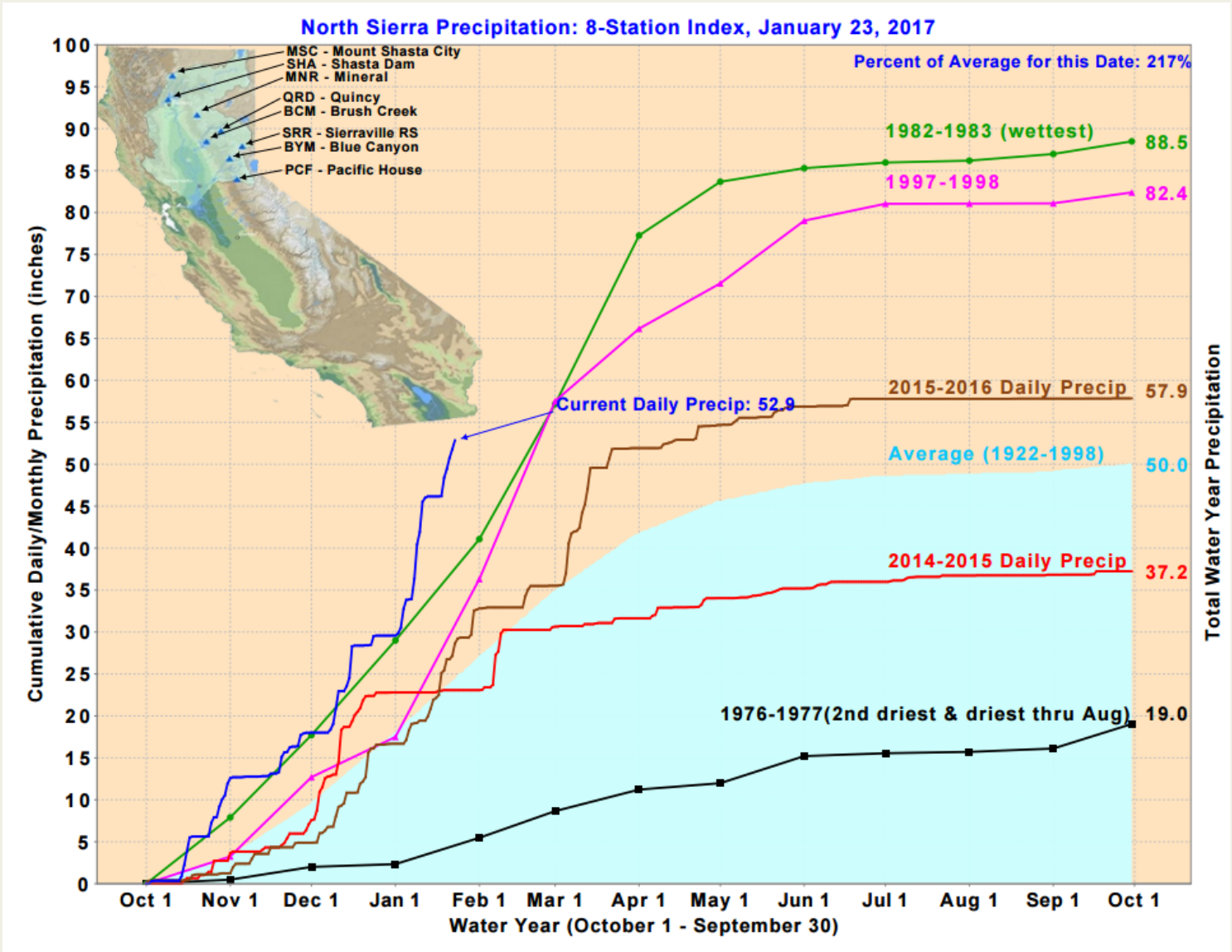


Temperature Anomaly



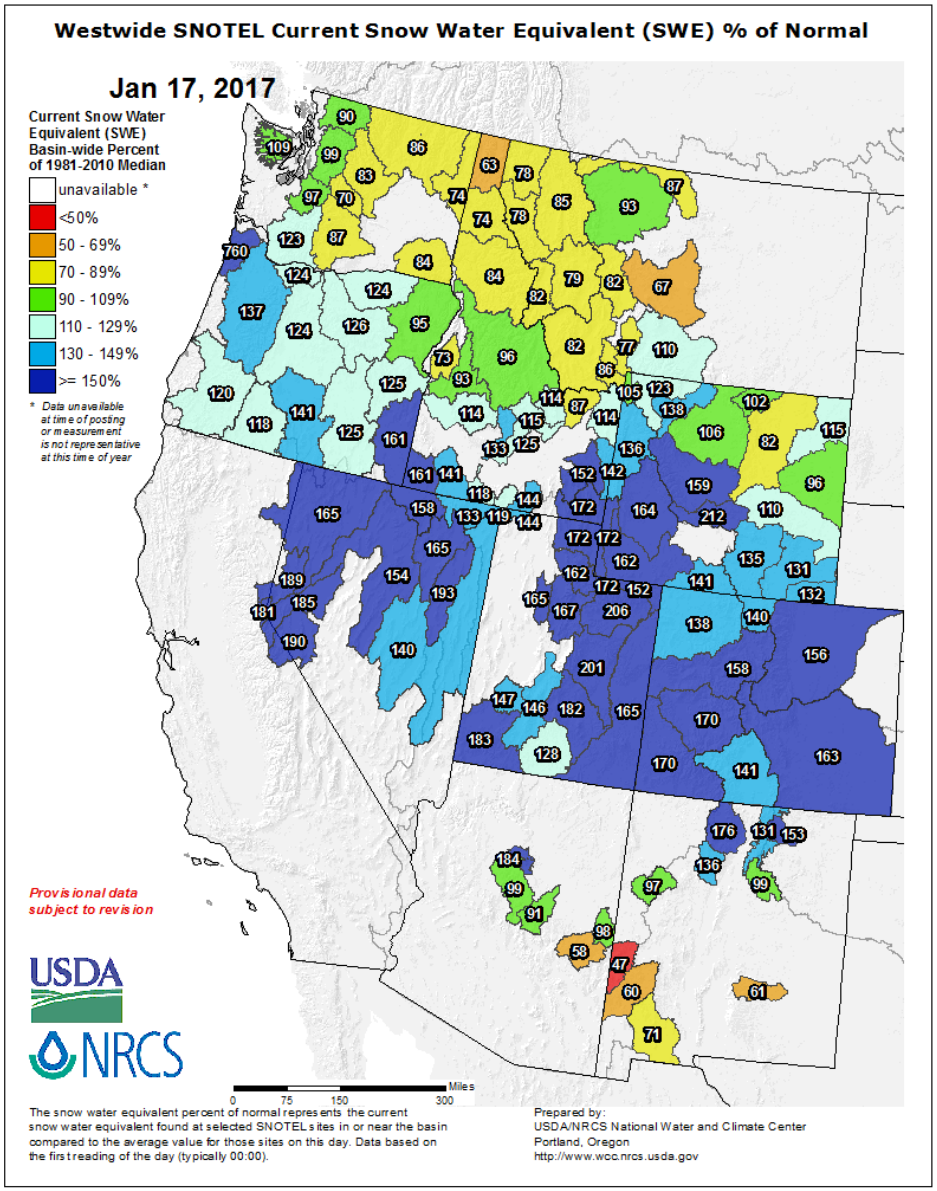
- Currently ENSO in a weak La Nina state…more later on that

2016/2017 Water Year Update



Source: CDEC/CA DWR

2016/2017 Water Year Update

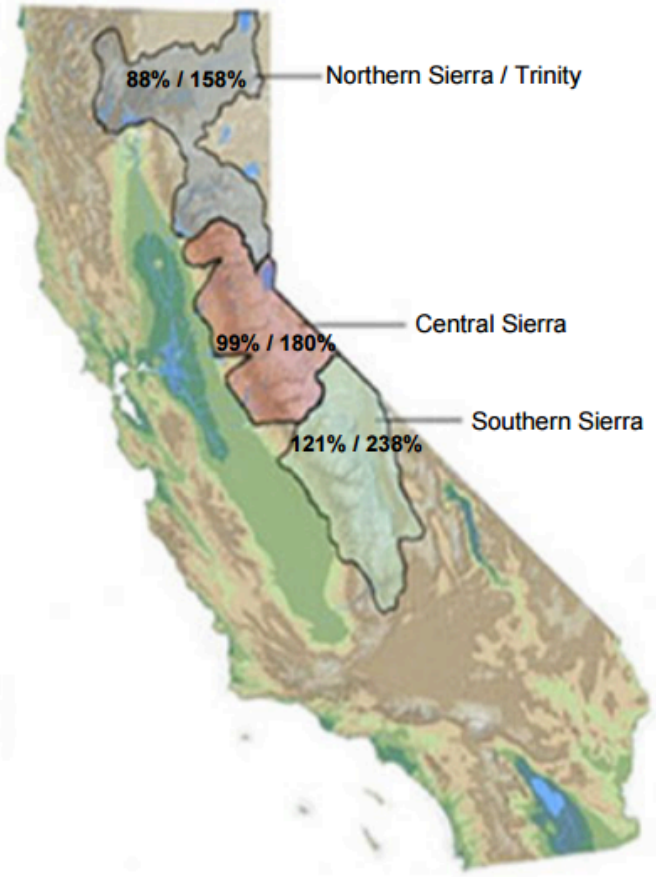


Source: NRCS

2016/2017 Water Year Update

Current Regional Snowpack from Automated Snow Sensors

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



NORTH	
Data as of January 23, 2017	
Number of Stations Reporting	19
Average snow water equivalent (Inches)	25.7
Percent of April 1 Average (%)	88
Percent of normal for this date (%)	158

CENTRAL	
Data as of January 23, 2017	
Number of Stations Reporting	25
Average snow water equivalent (Inches)	33.6
Percent of April 1 Average (%)	99
Percent of normal for this date (%)	180

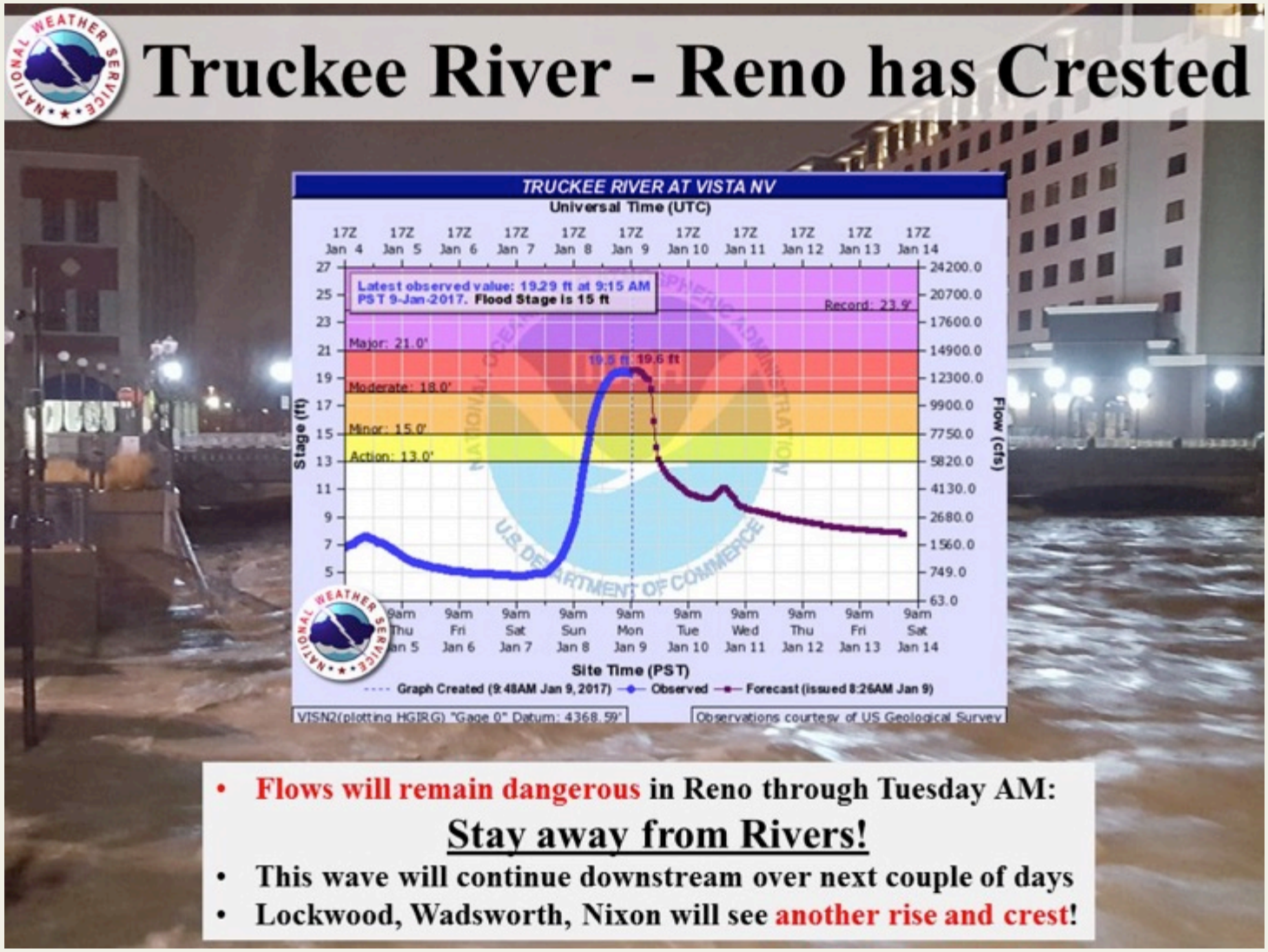
SOUTH	
Data as of January 23, 2017	
Number of Stations Reporting	30
Average snow water equivalent (Inches)	31.5
Percent of April 1 Average (%)	121
Percent of normal for this date (%)	238

STATE	
Data as of January 23, 2017	
Number of Stations Reporting	74
Average snow water equivalent (Inches)	30.7
Percent of April 1 Average (%)	104
Percent of normal for this date (%)	193

Statewide Average: 104% / 193%

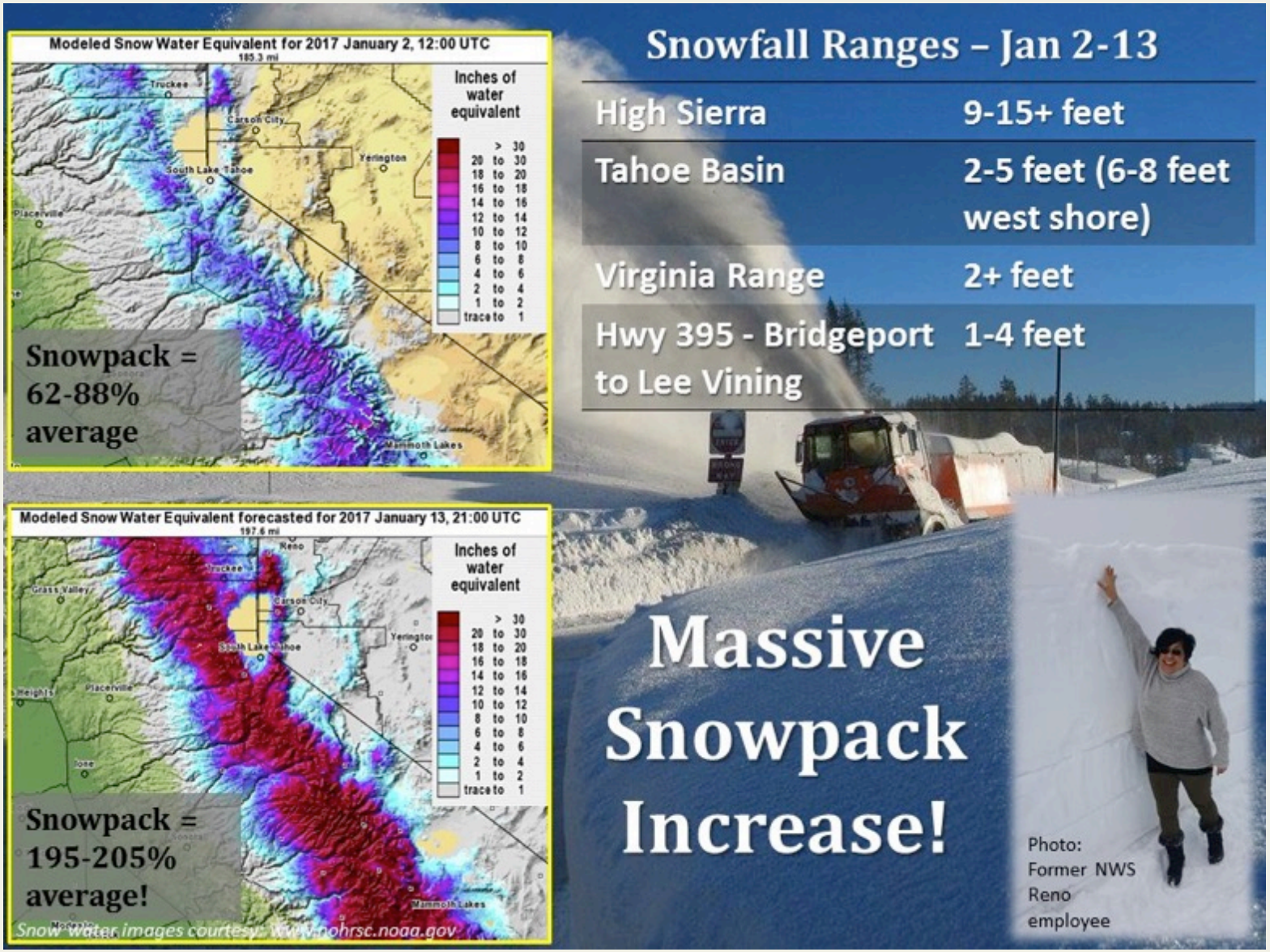
Source: CDEC/CA DWR

2016/2017 Water Year Update



Source: NWS Reno

2016/2017 Water Year Update



Source: NWS Reno

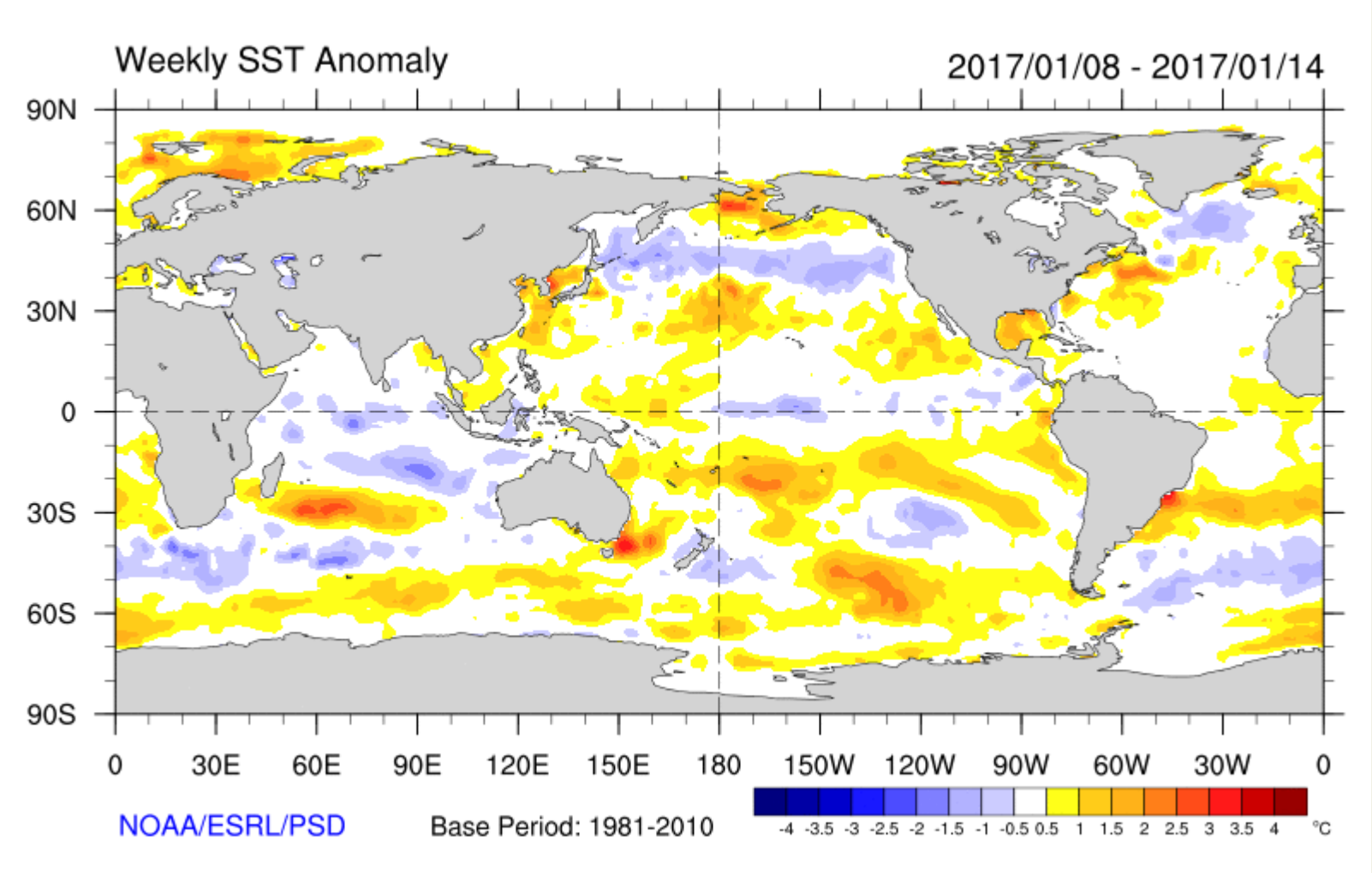
El Nino Status

- ENSO Alert System Status: La Niña Advisory
- La Niña conditions are present
- Equatorial sea surface temperatures (SSTs) are near-to-below average in the central and east-central Pacific Ocean. They are above-average in the far eastern Pacific Ocean.
- A transition to ENSO-neutral is expected to occur by February 2017, with ENSO-neutral then continuing through the first half of 2017. *

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/.

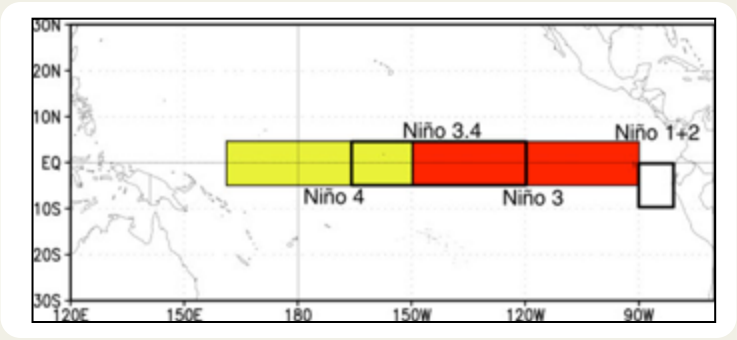
Current Sea Surface Temperatures

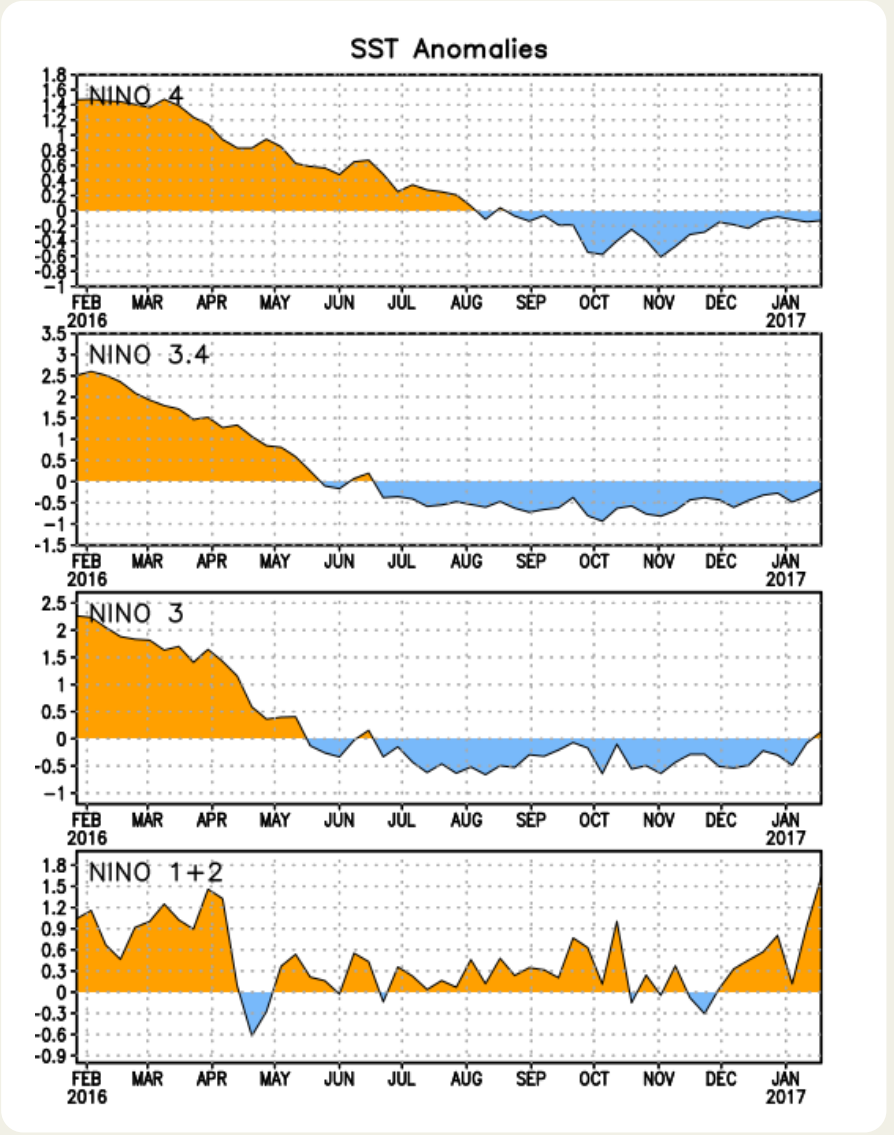


Niño Region SST Departures (ºC) Recent Evolution

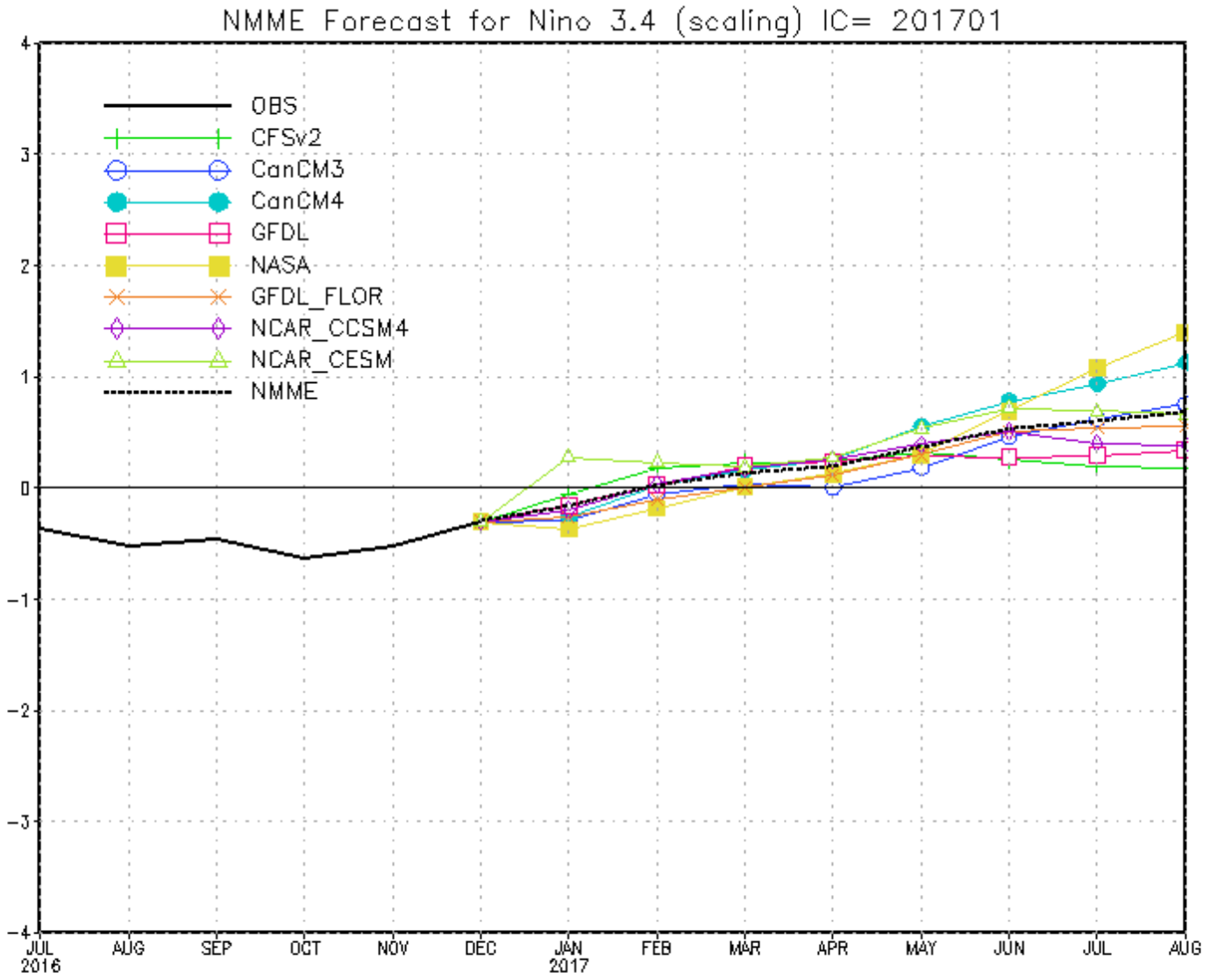
The latest weekly SST departures are:

Niño 4	**-0.1ºC**
Niño 3.4	**-0.2ºC**
Niño 3	**0.1ºC**
Niño 1+2	**1.6ºC**



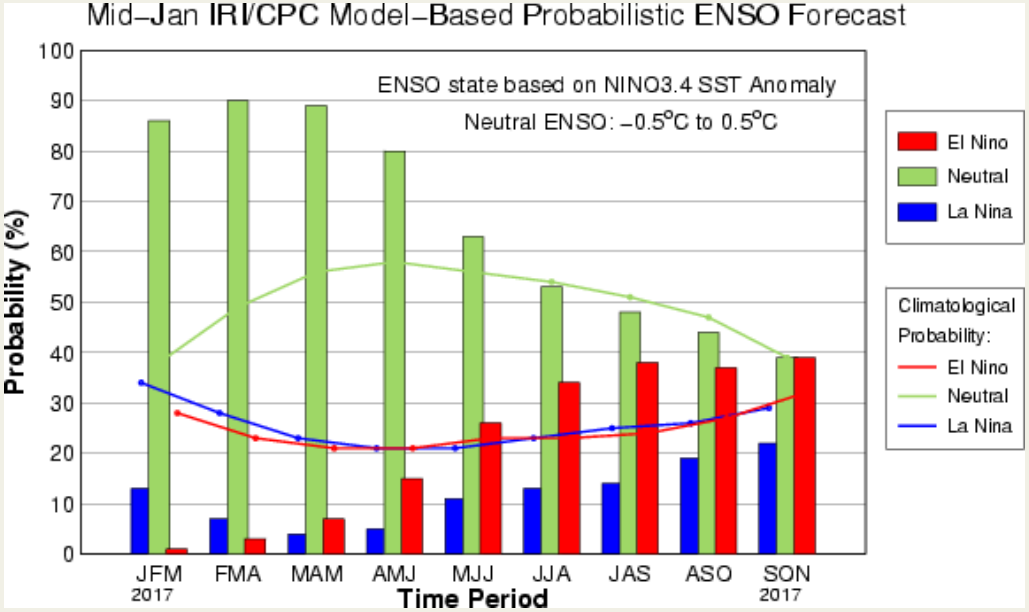


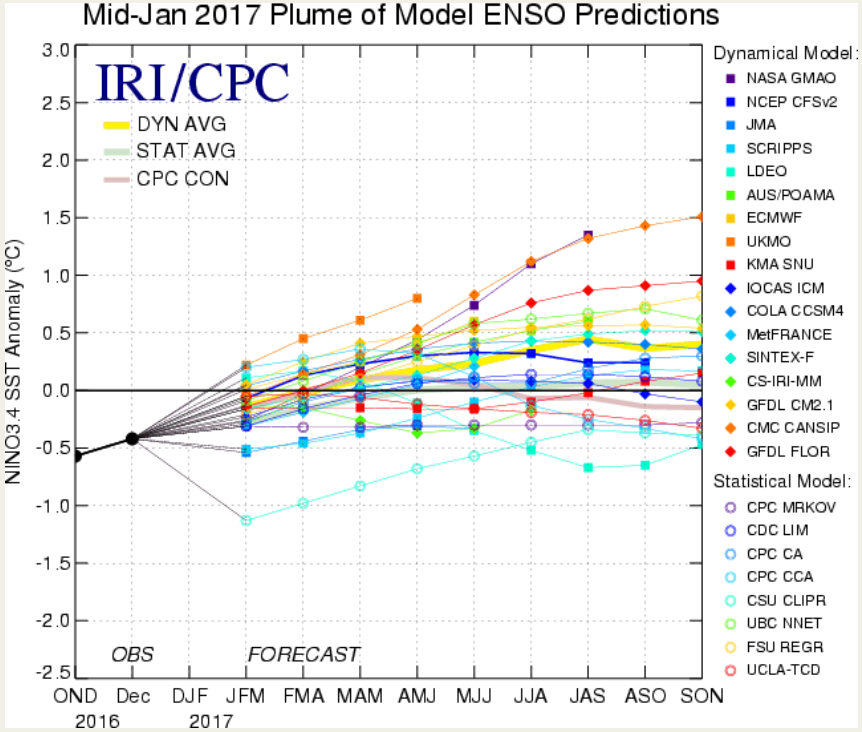
ENSO Forecasts



Source: NOAA/CPC

ENSO Forecasts



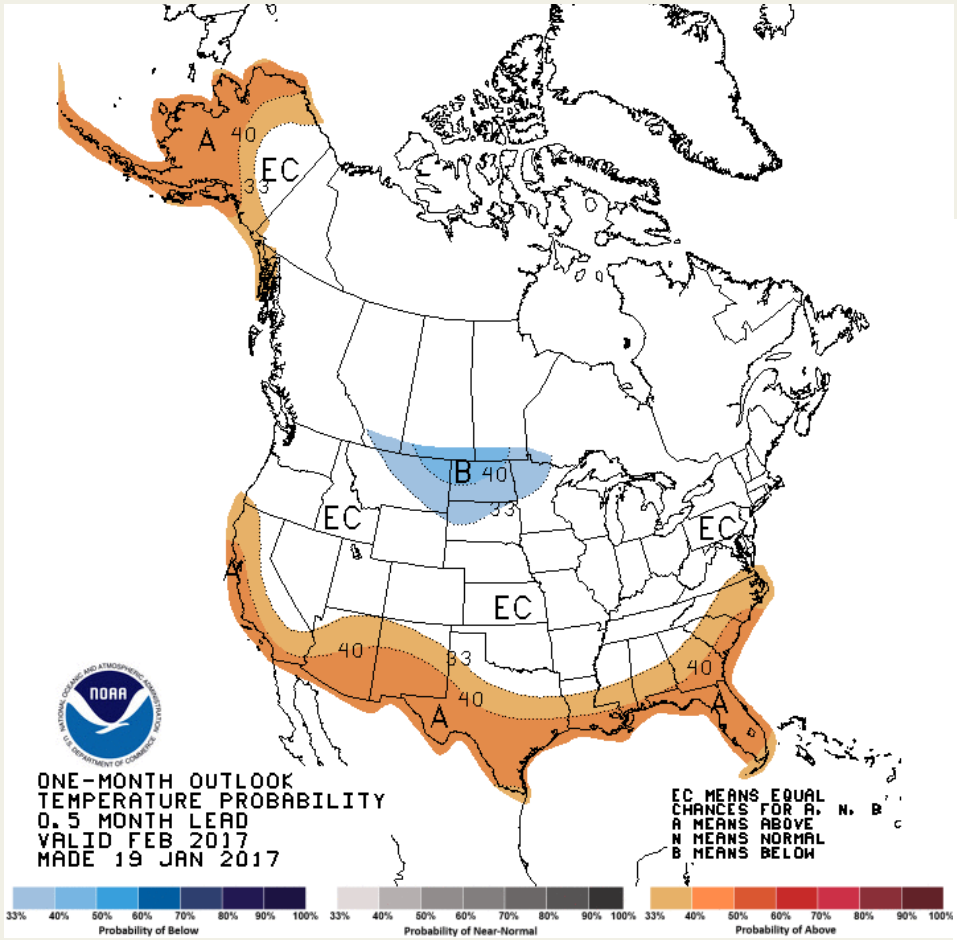


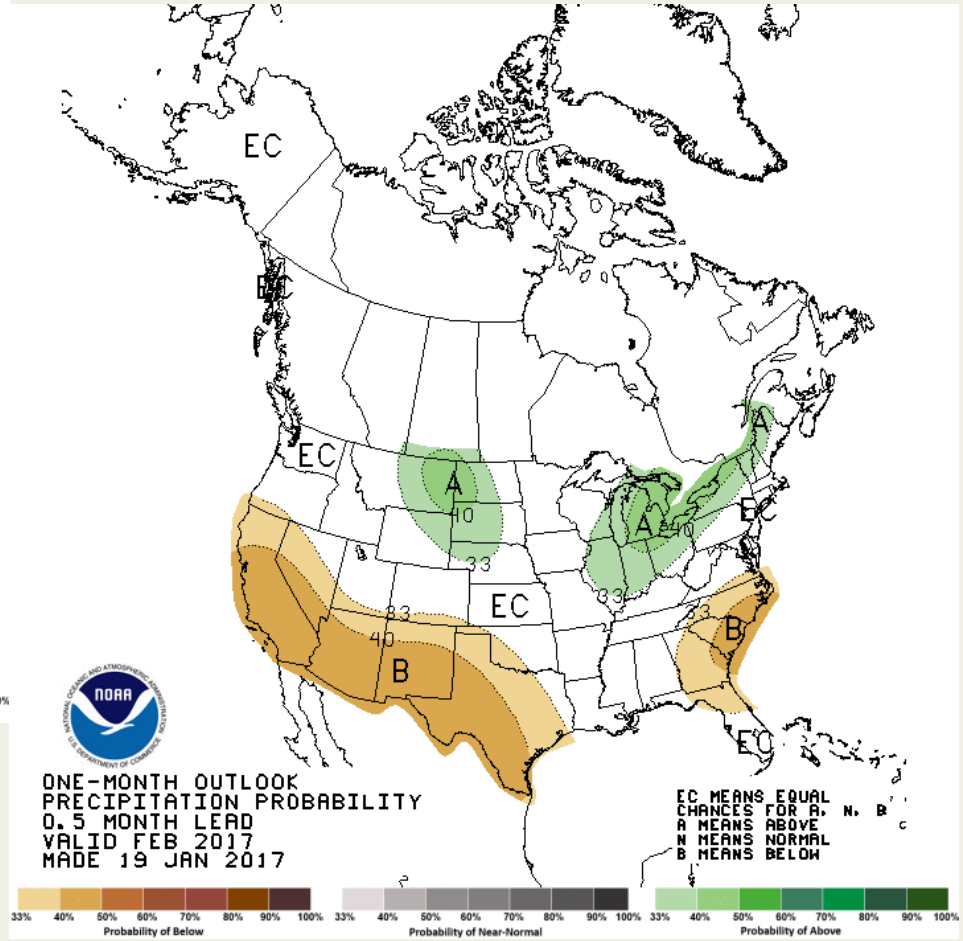
CPC/IRI El Nino forecast:

NMME models + other dynamical models + statistical models

Source: CPC/IRI

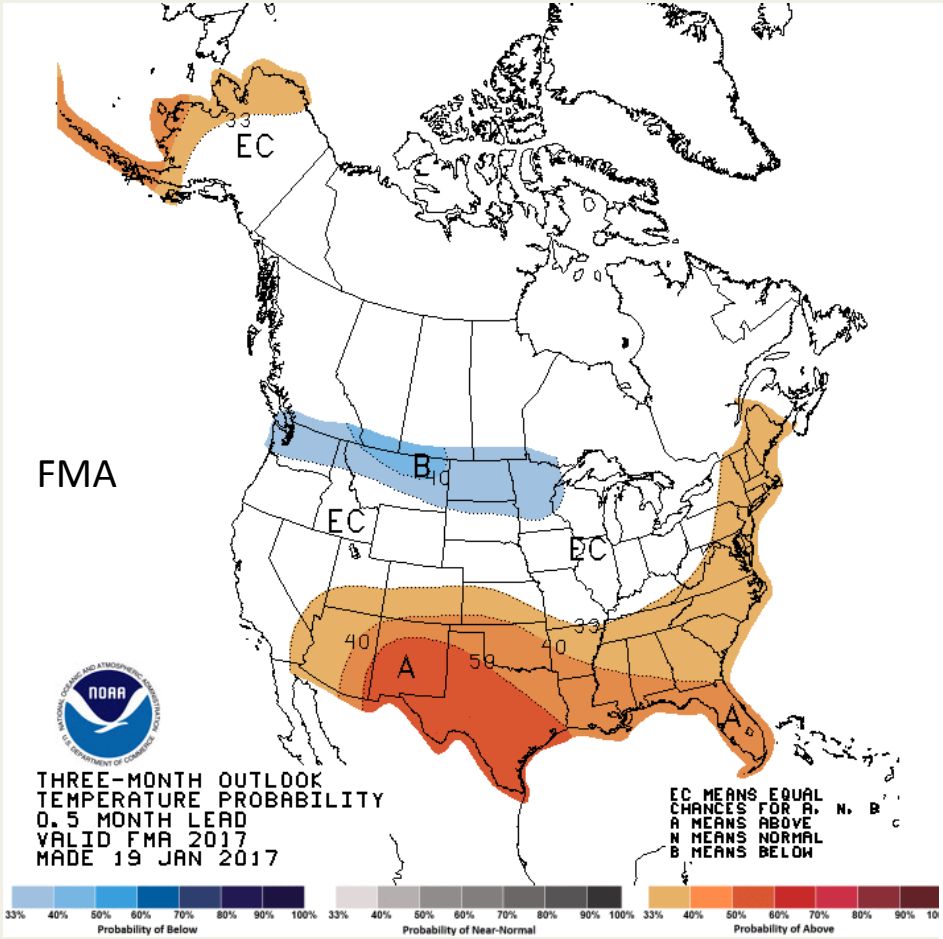
February U.S. Forecasts

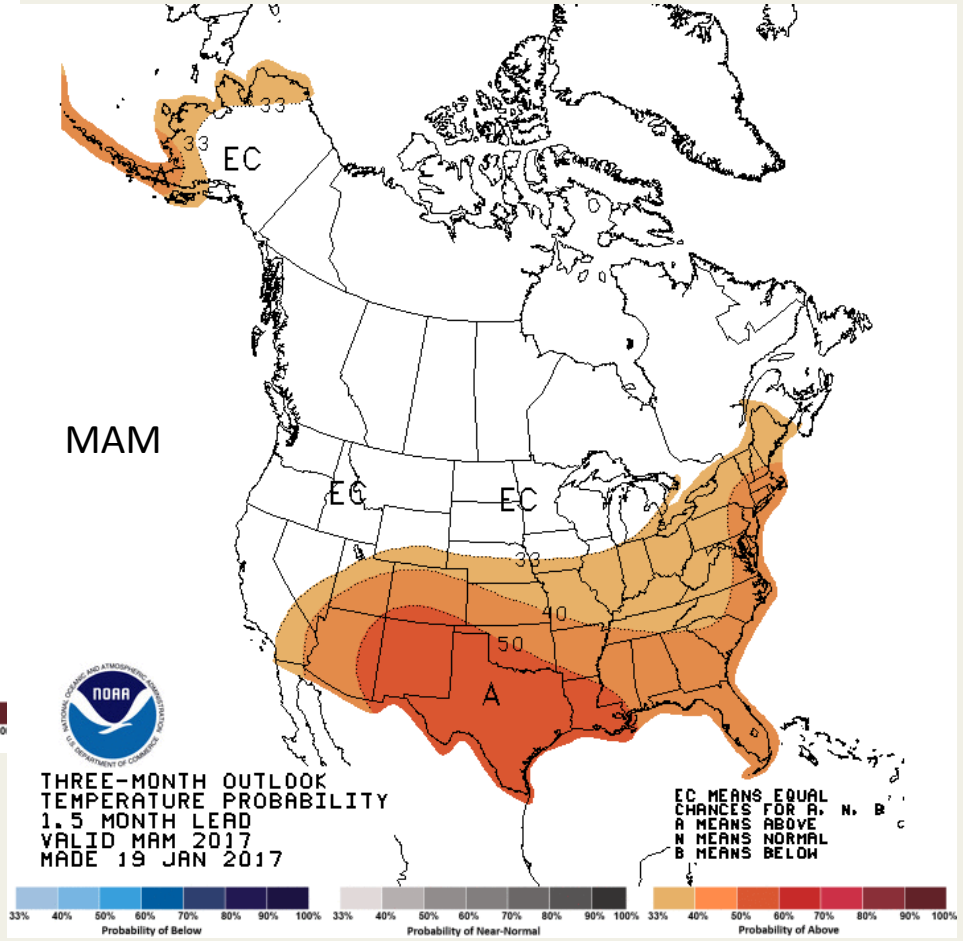




Source: NOAA/CPC

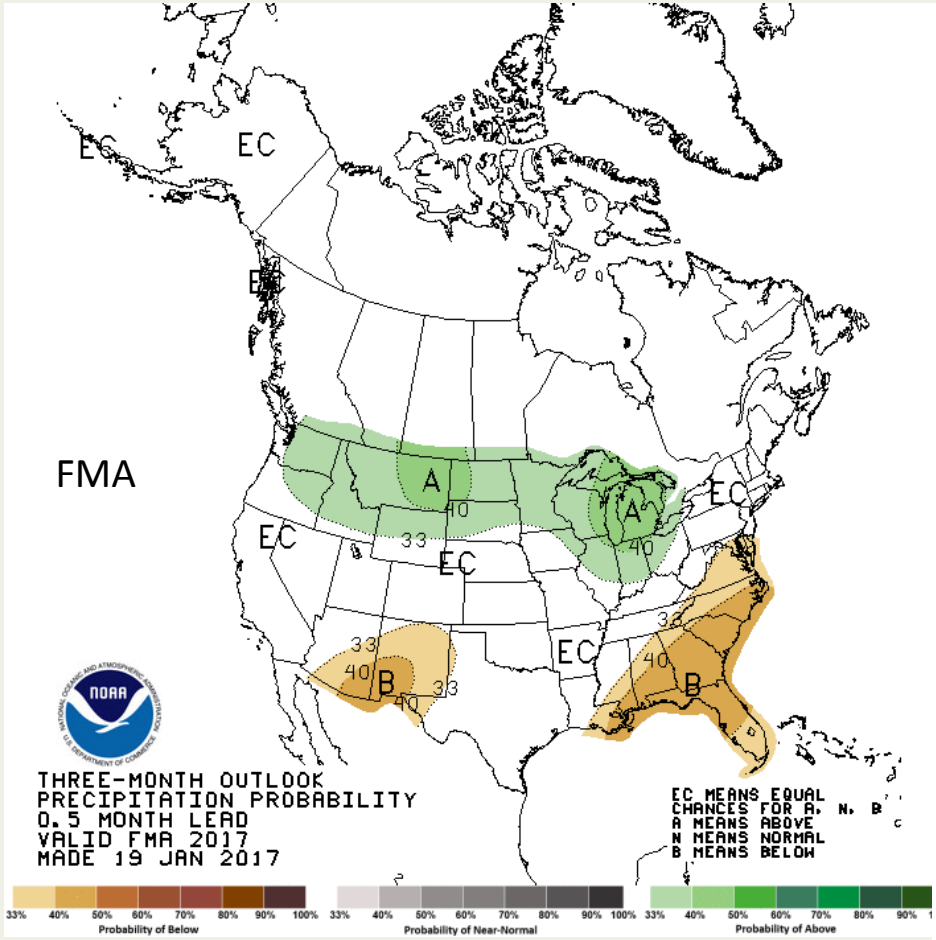
U.S. Temperature Forecasts

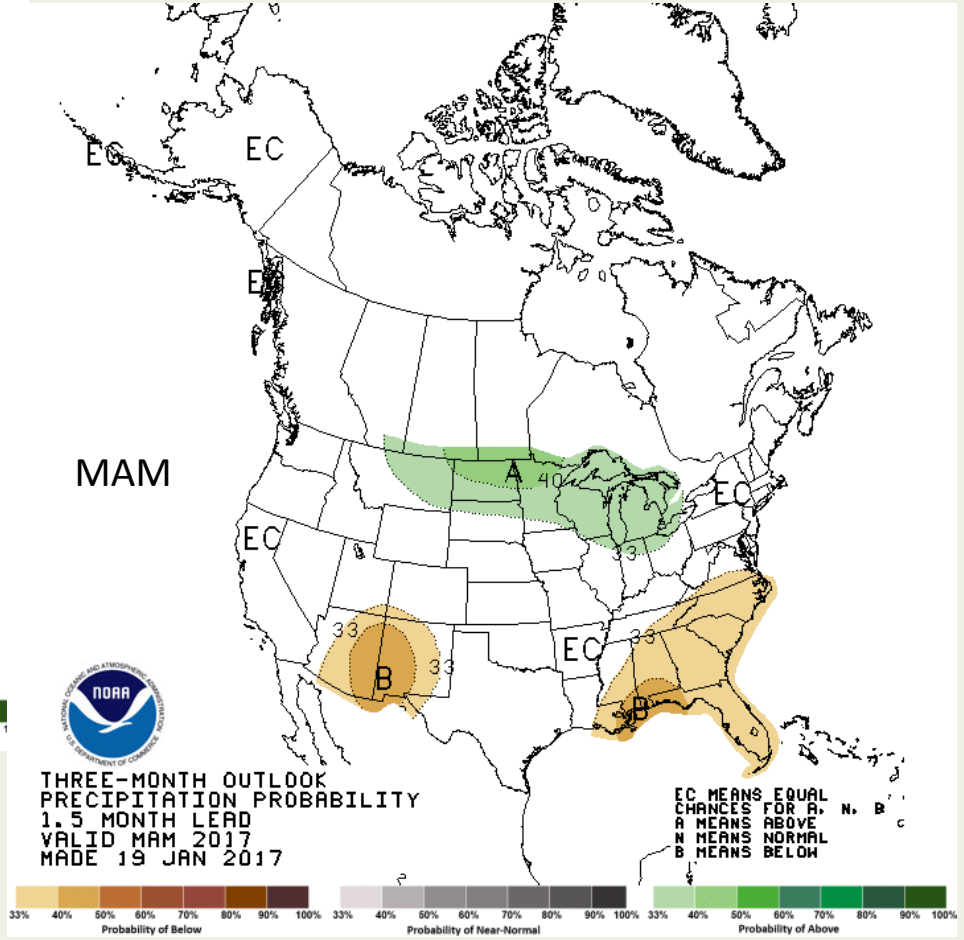




Source: NOAA/CPC

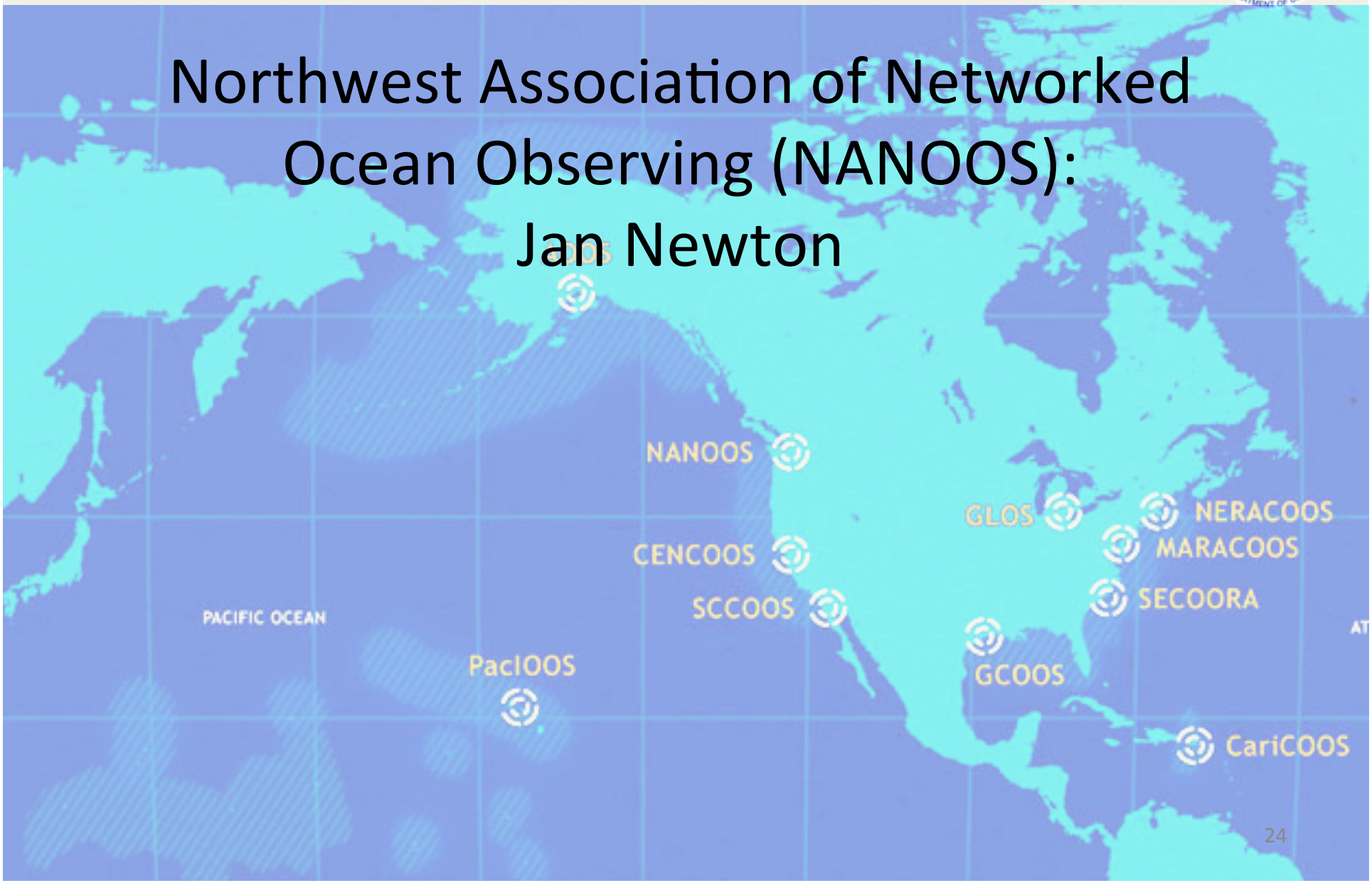
U.S. Precipitation Forecasts





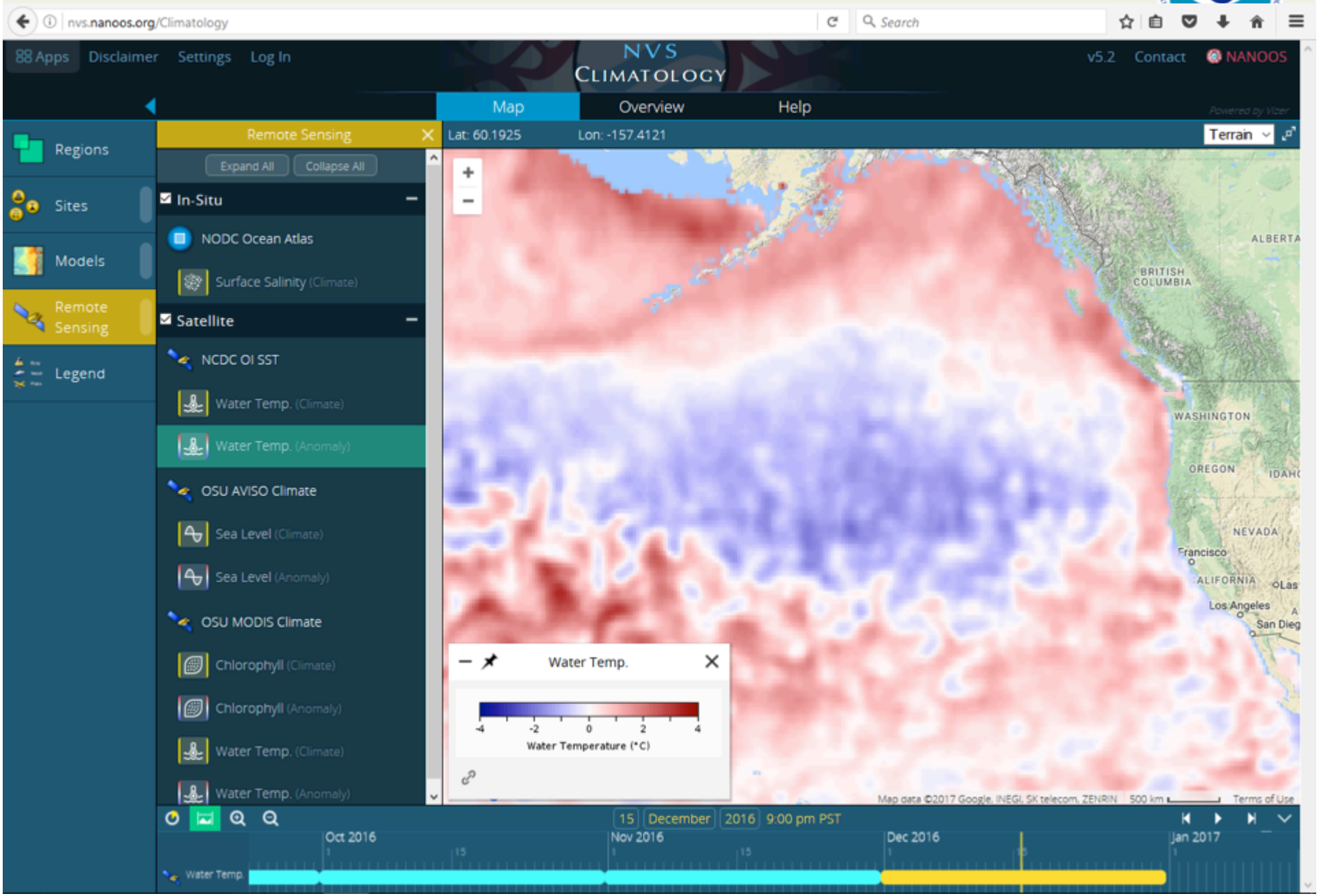
Source: NOAA/CPC

IOOS Nearshore Condition Updates



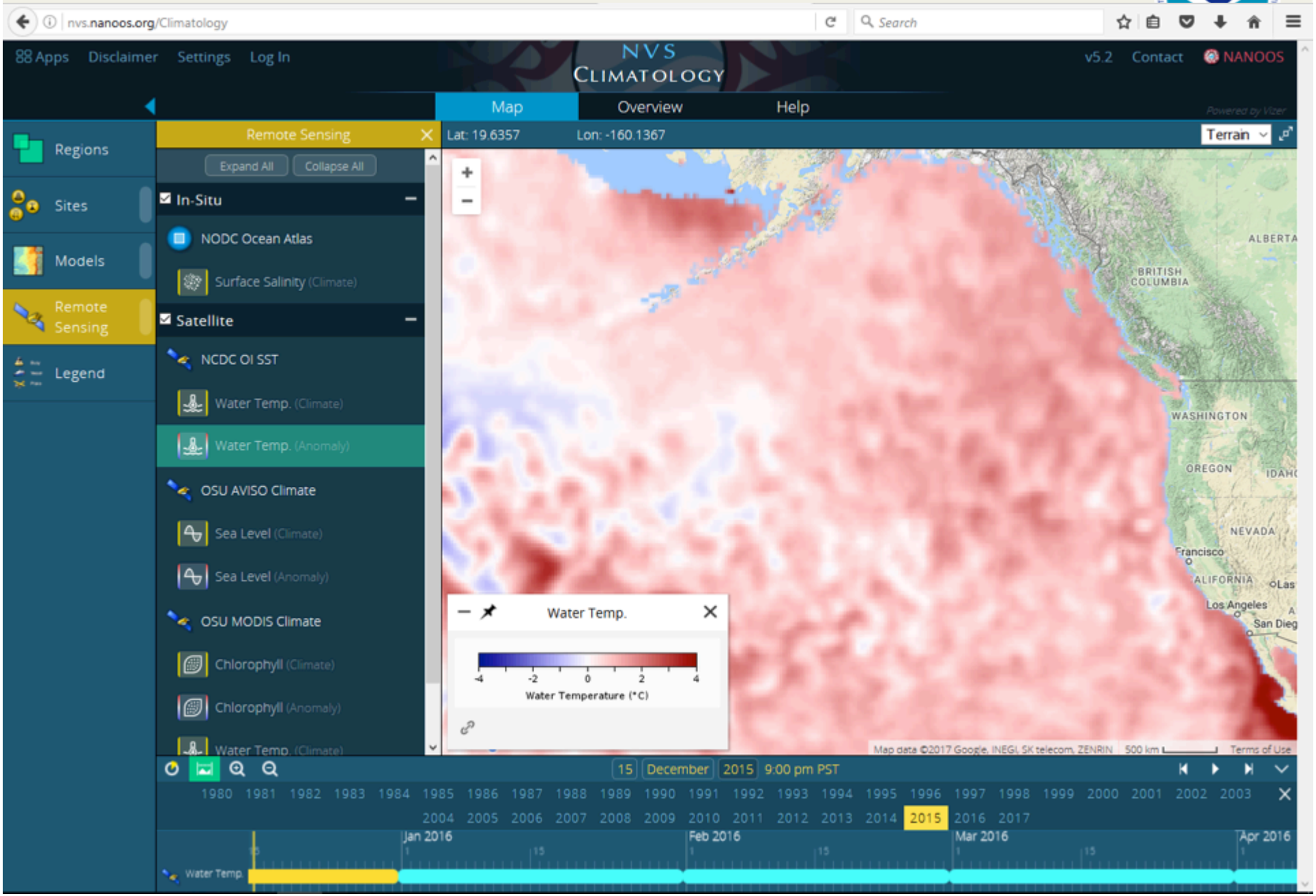
NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature: December 2016



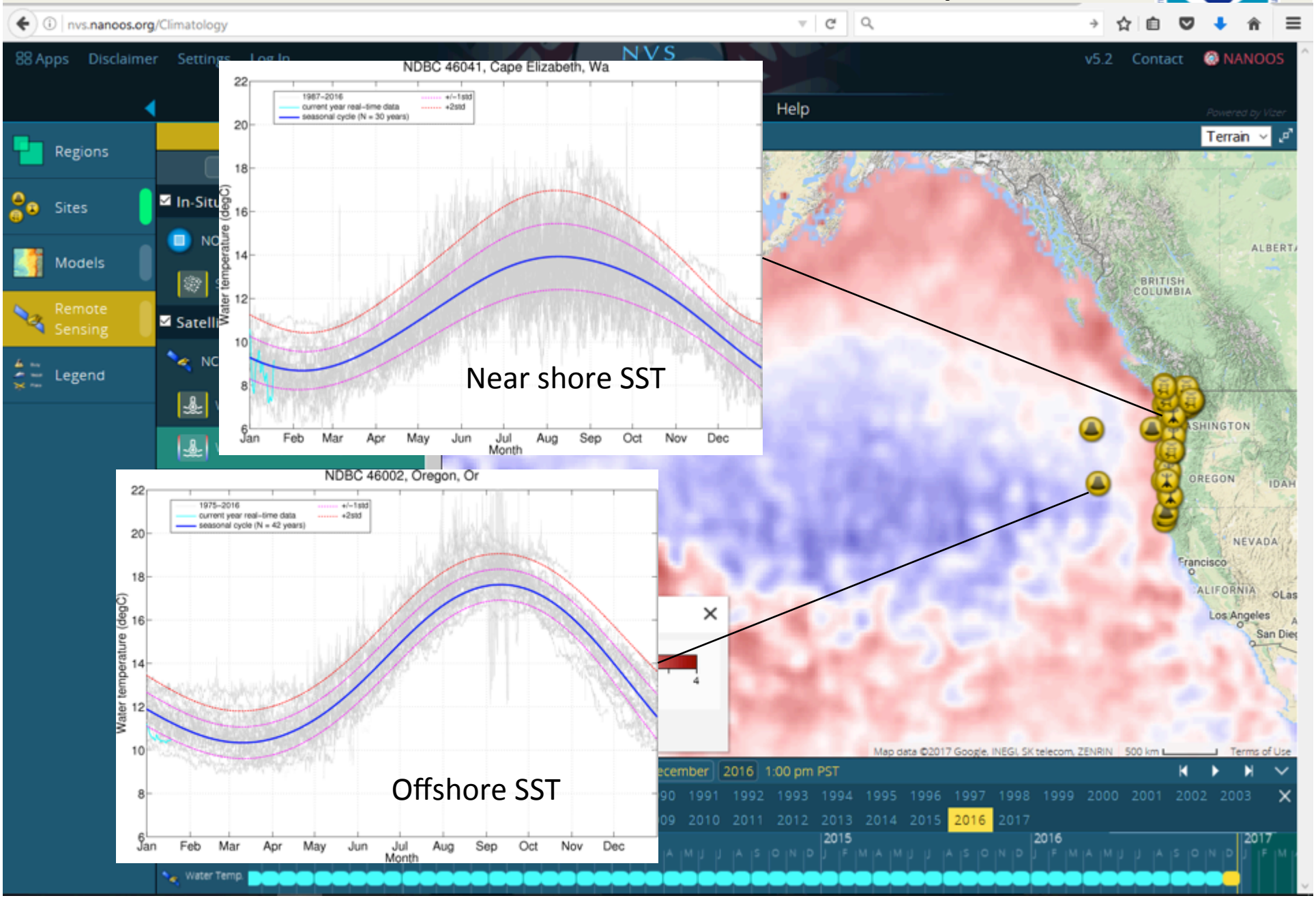
NANOOS: www.nanoos.org Climatology app

Compare with December 2015



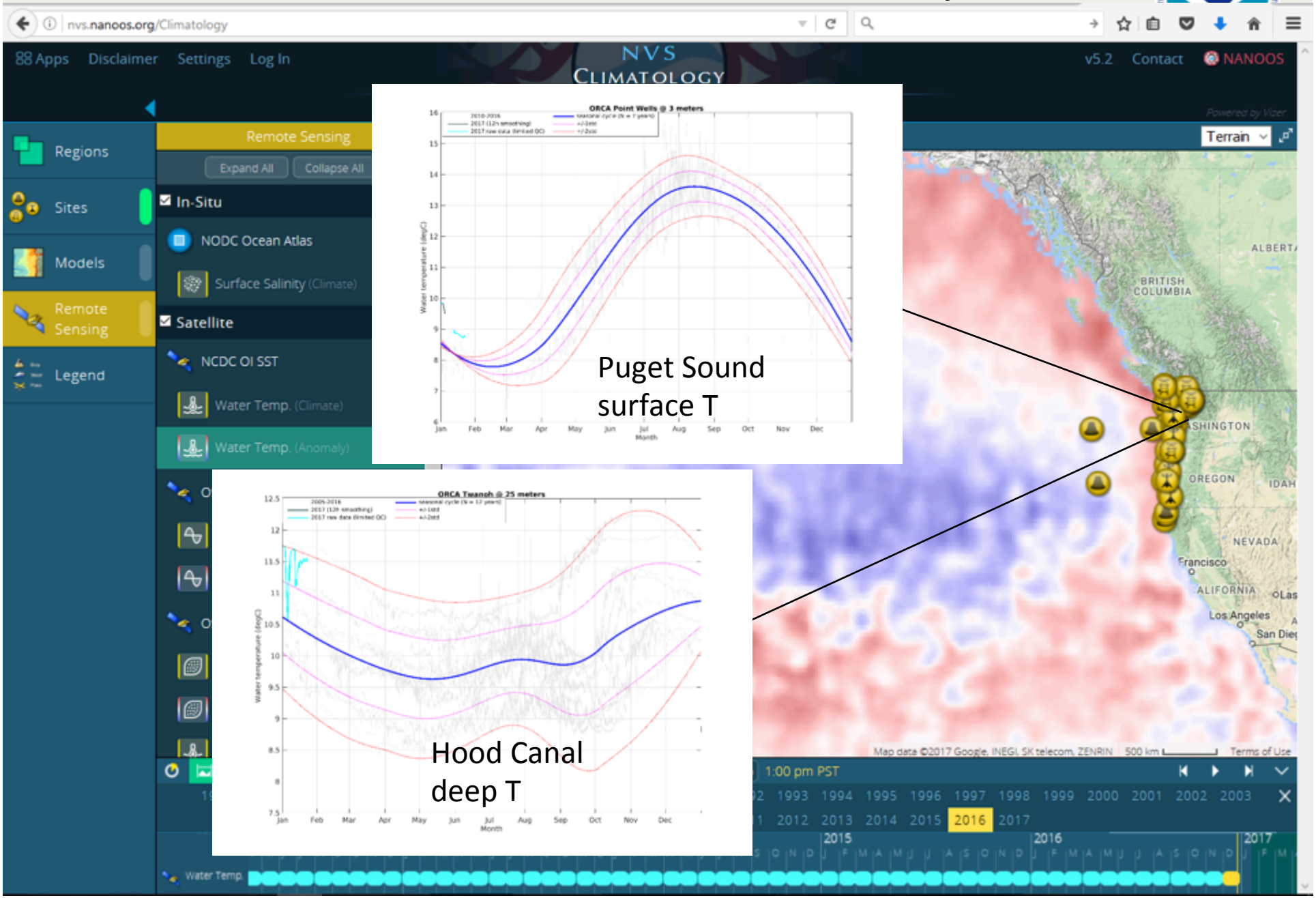
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Sea Surface Temperature: December 2016



NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature: December 2016

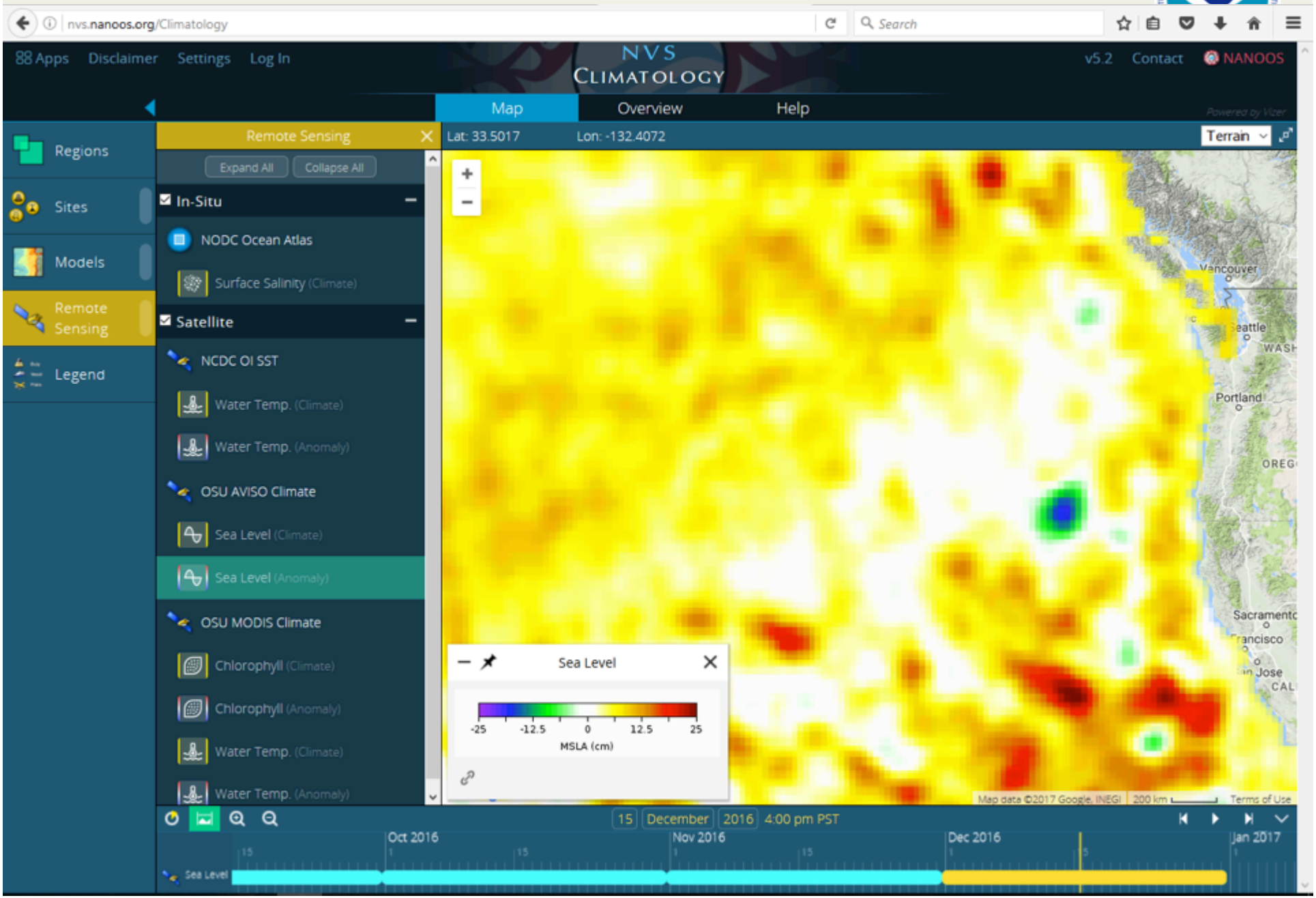


Puget Sound surface T

Hood Canal deep T

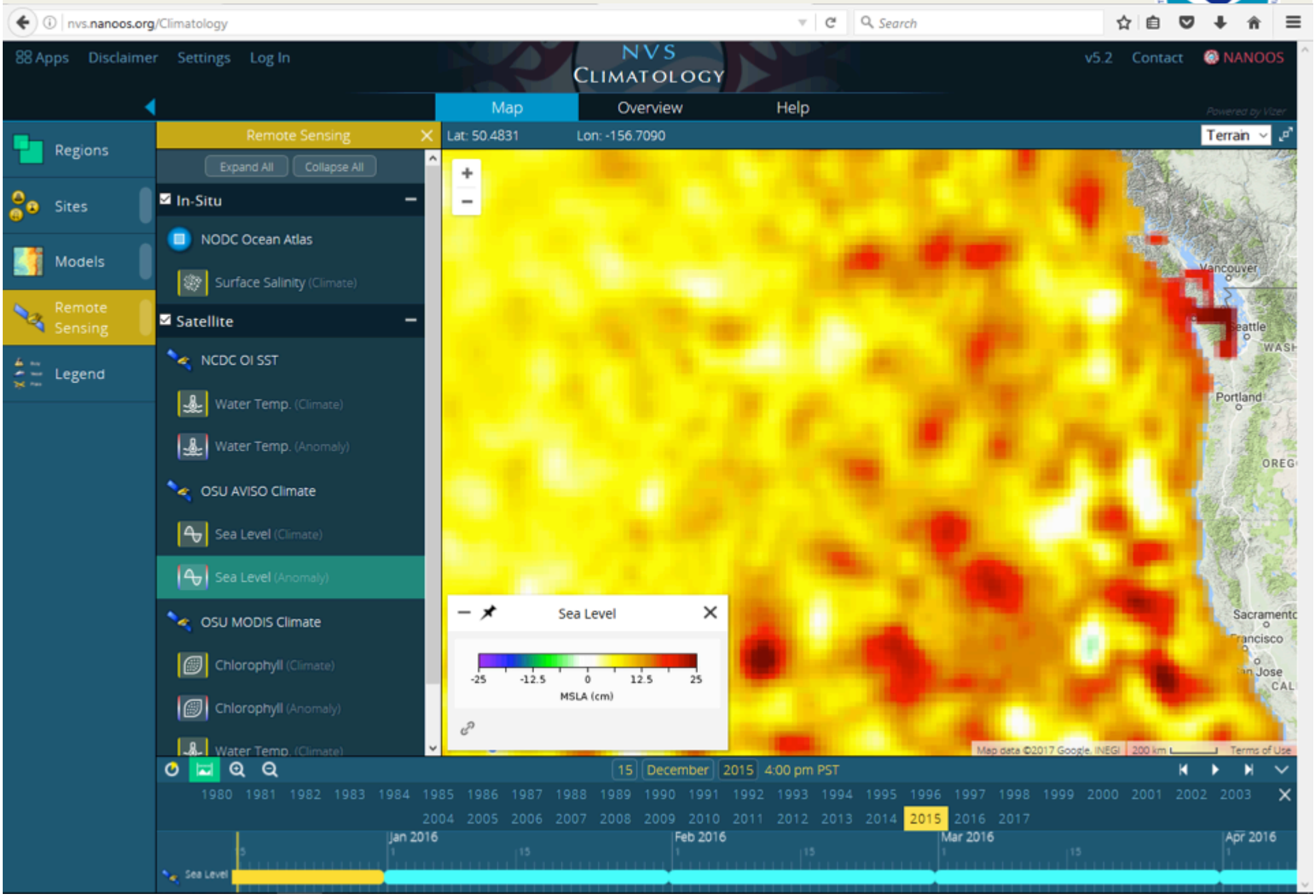
NANOOS: www.nanoos.org Climatology app

Mean Sea Level: December 2016



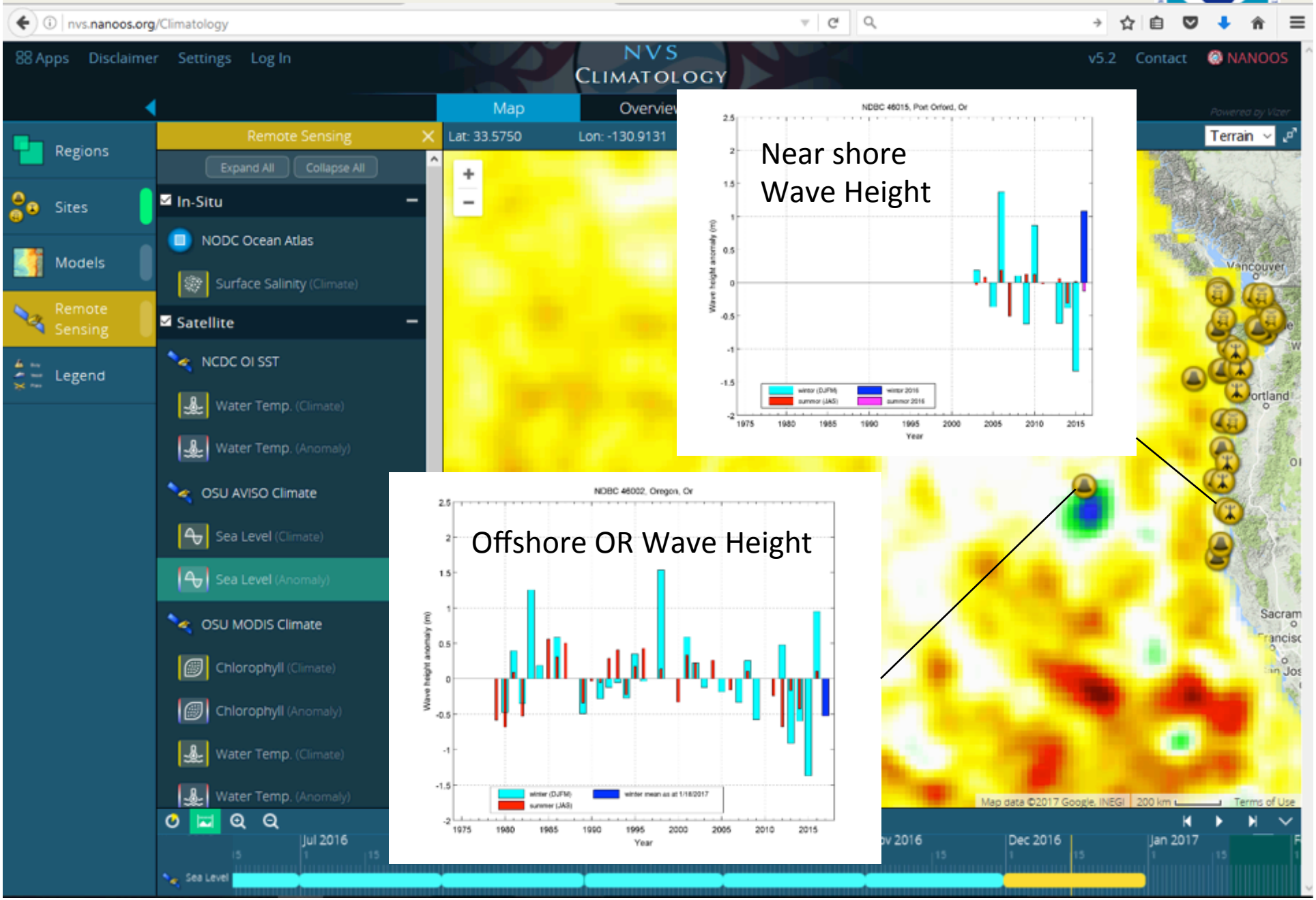
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Compare with December 2015

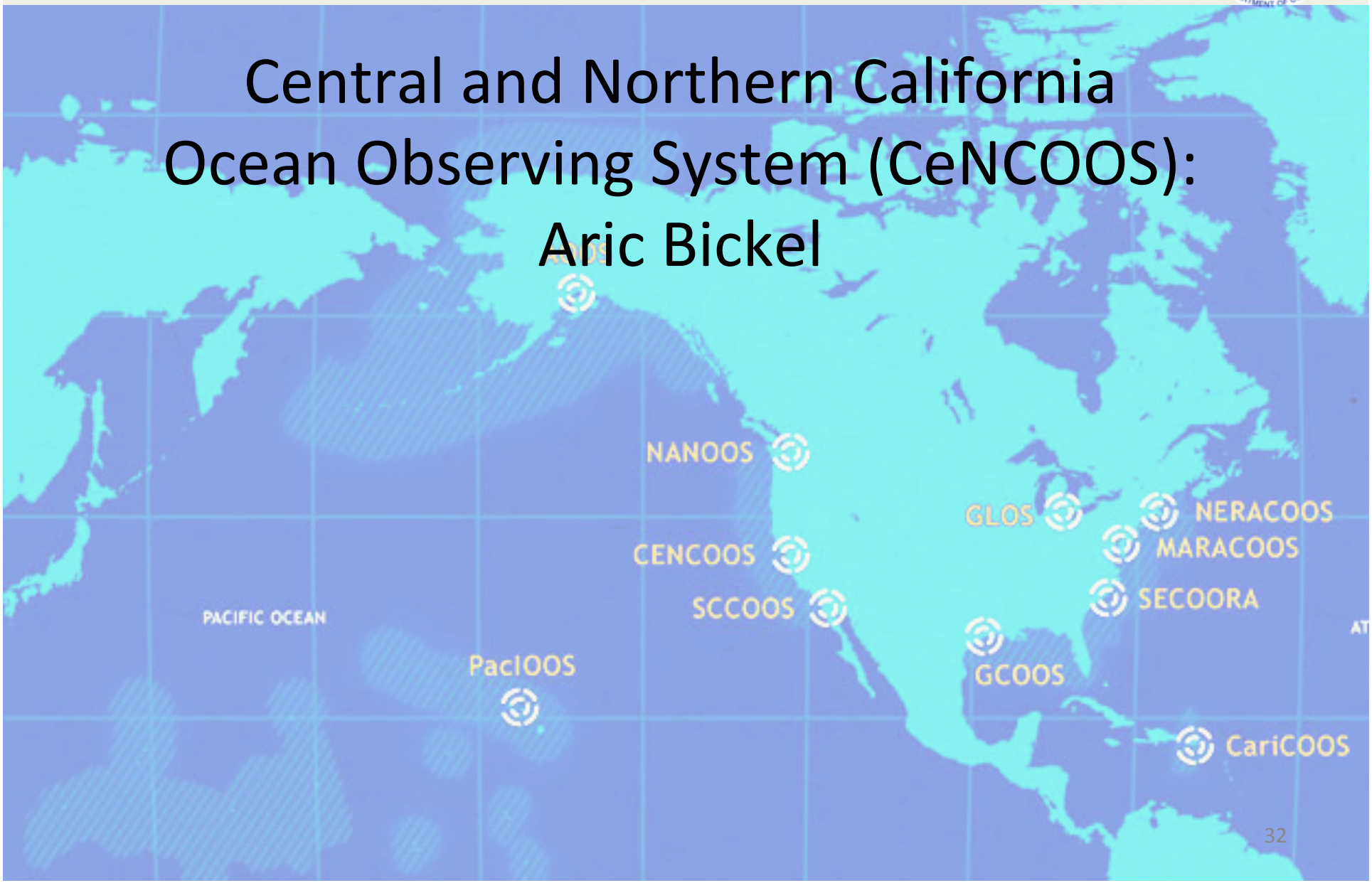


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Mean Sea Level: December 2016



IOOS Nearshore Condition Updates

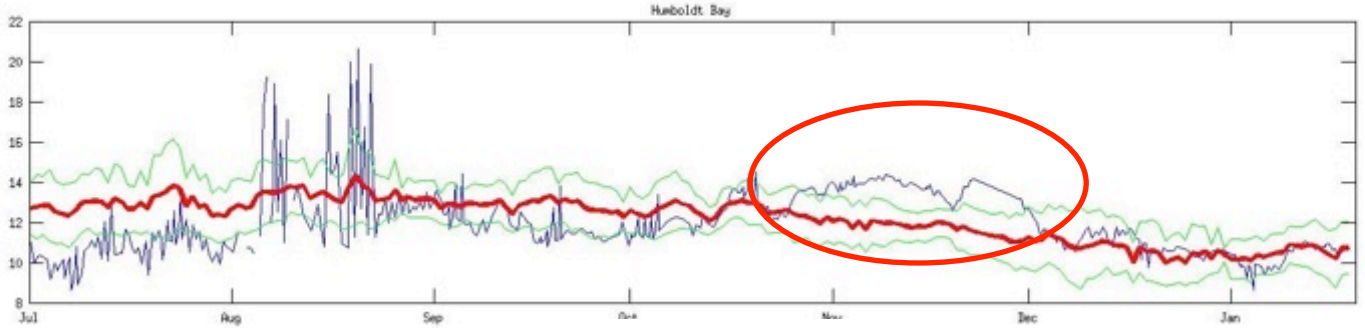


Central and Northern California Ocean Observing System (CeNCOOS)

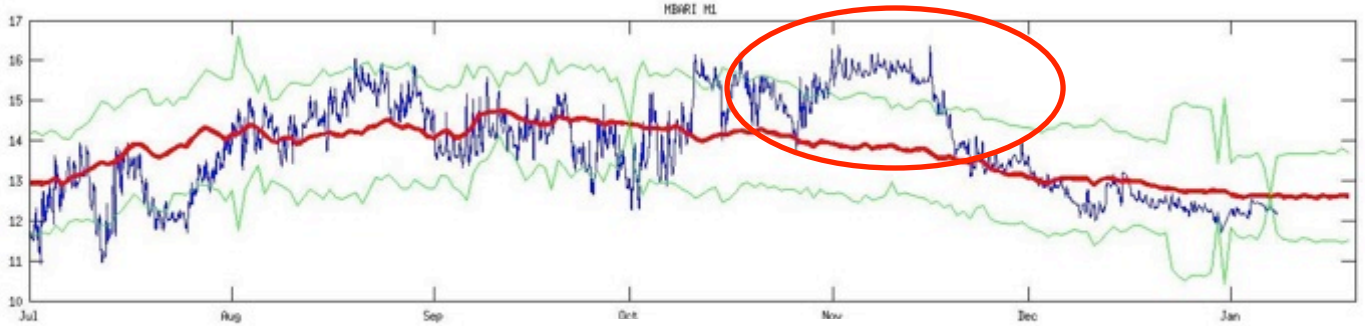


Recent Nearshore Temperature Observations

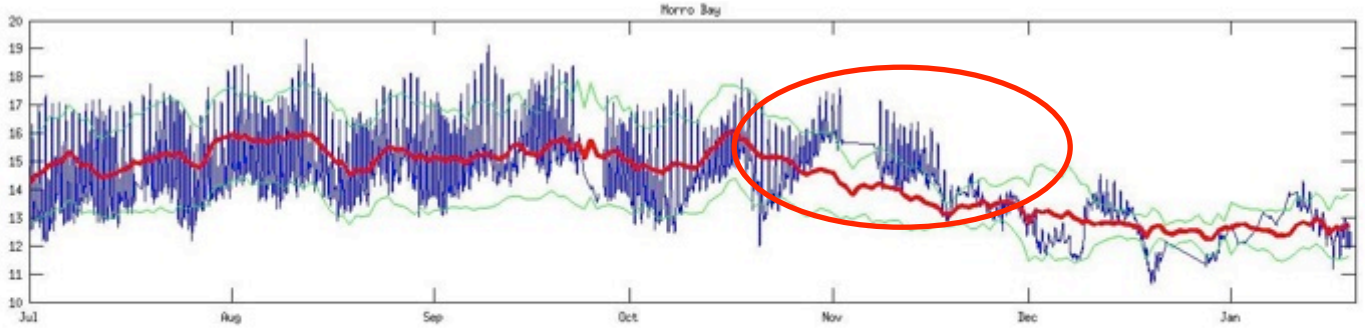
Humboldt Bay



Monterey Bay (M1)

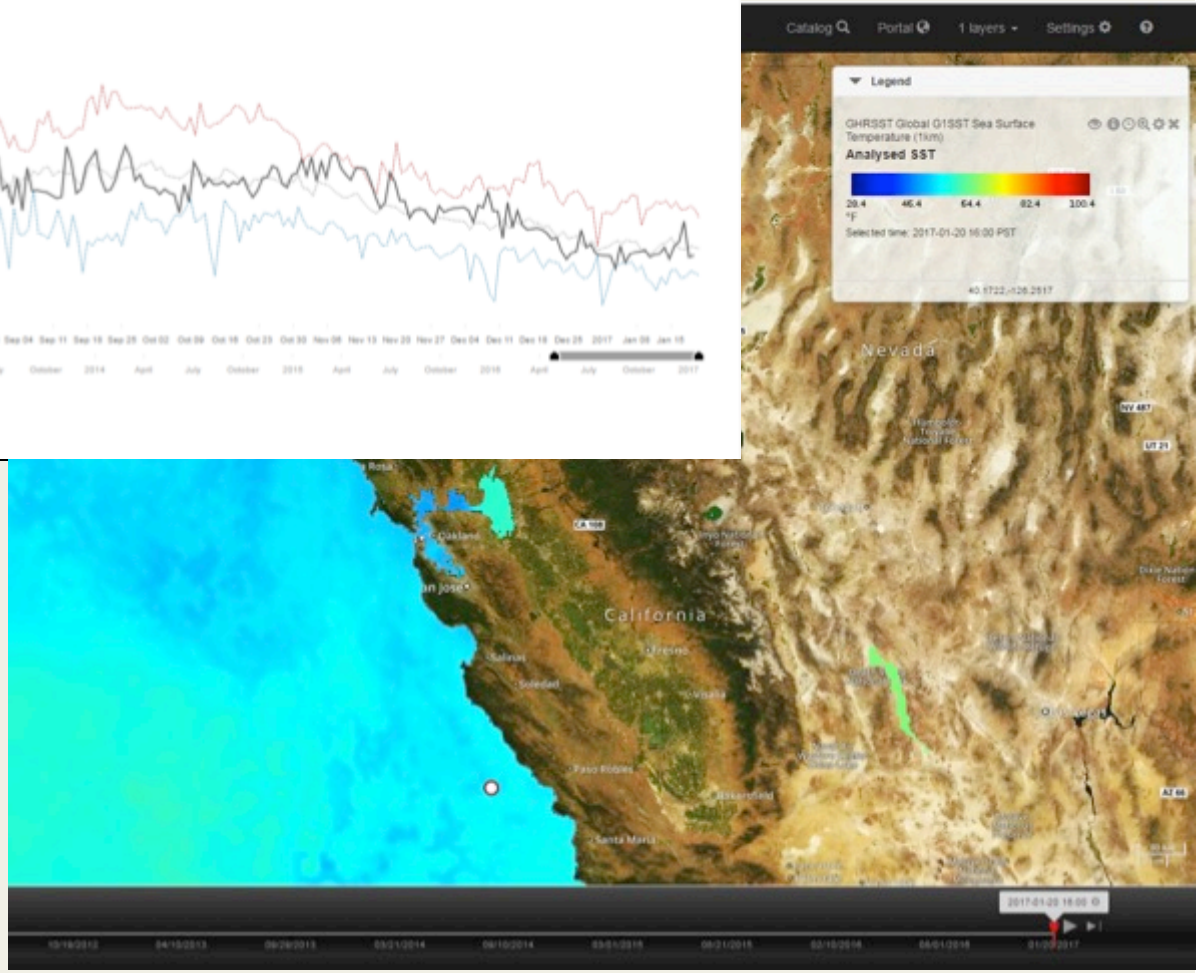


Morro Bay

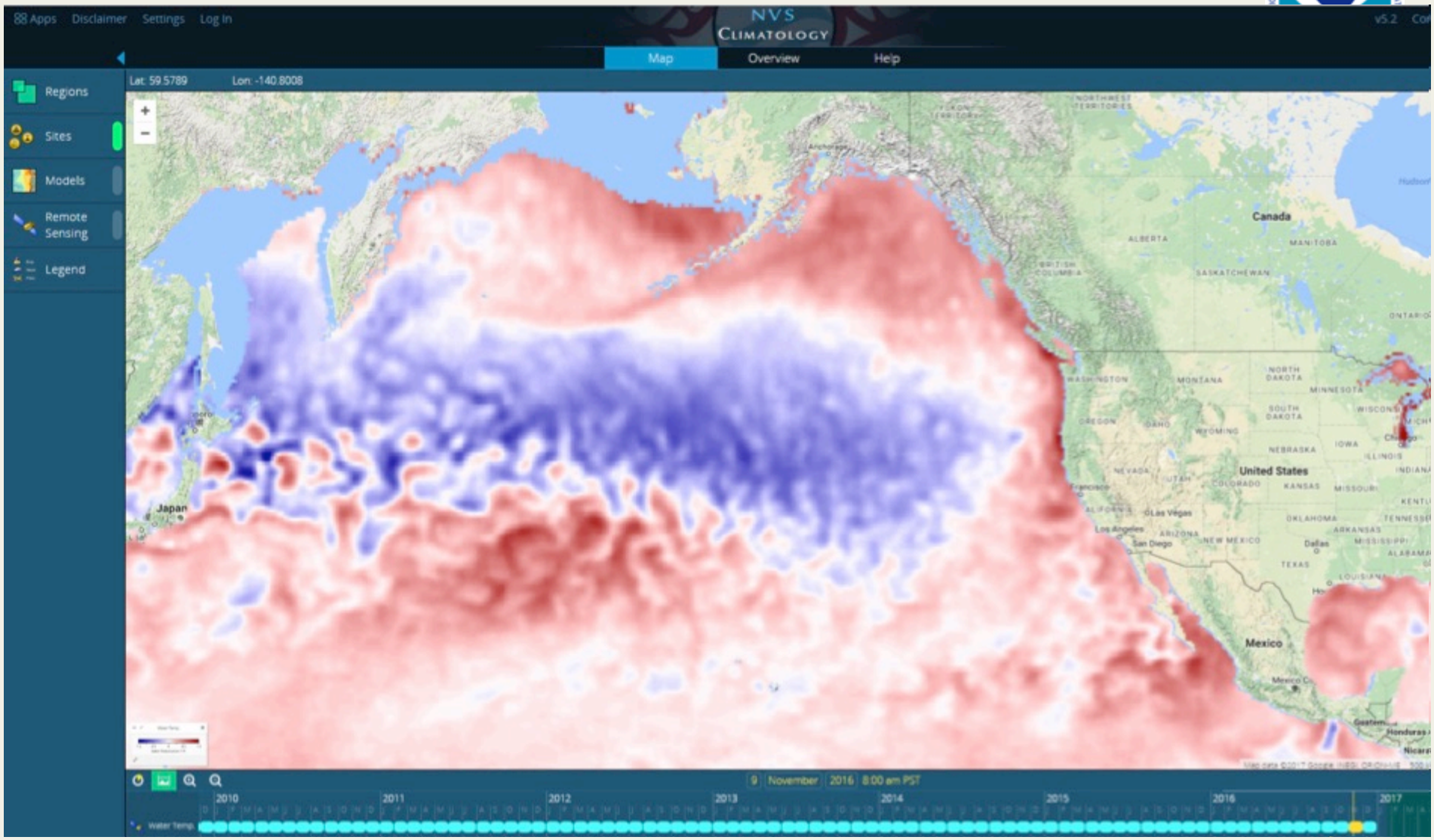


Satellite SST observations (GHRSST daily analyzed)



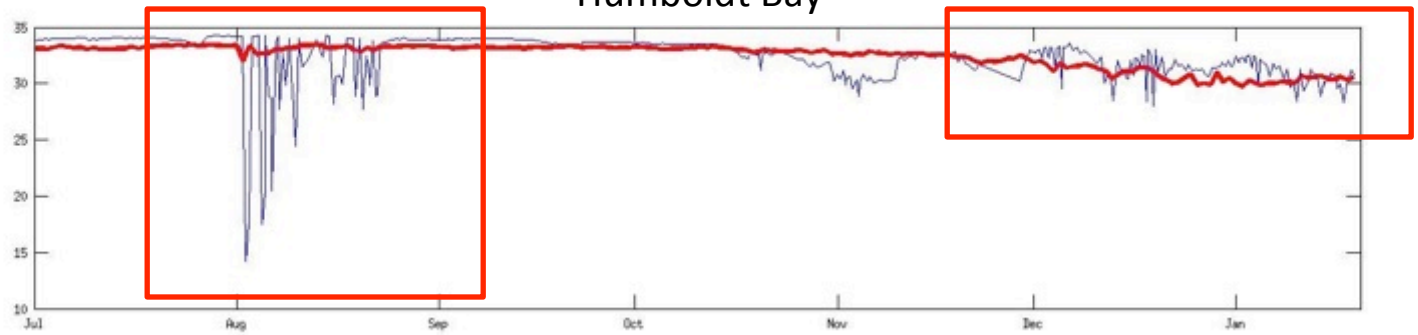


data.cencoos.org

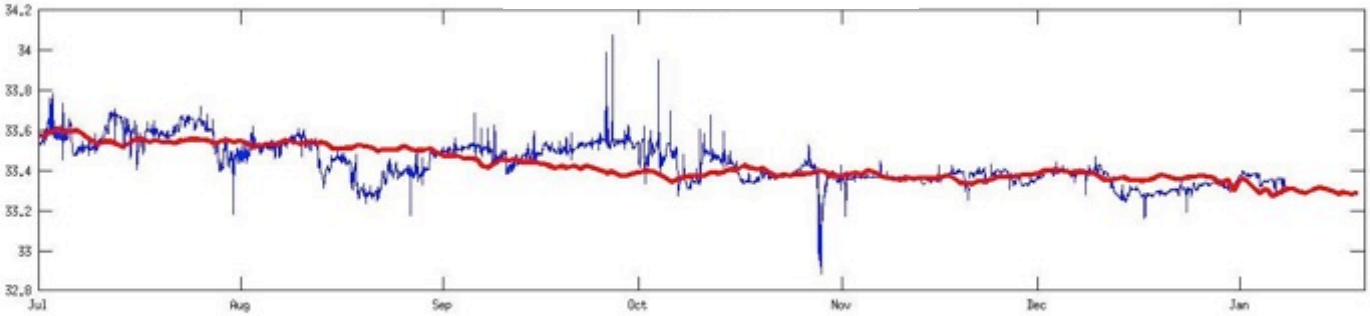

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NVS
Climatology
v5.2
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Overview
Help
Regions
Sites
Models
Remote Sensing
Legend
Lat: 59.5789
Lon: -140.8008
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Water Temp

Recent Nearshore Salinity Observations

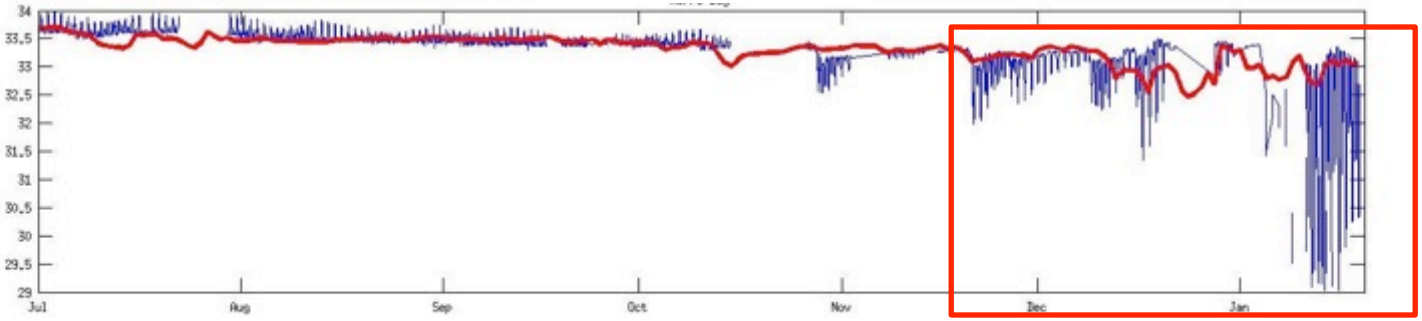
Humboldt Bay



Monterey Bay (M1)



Morro Bay



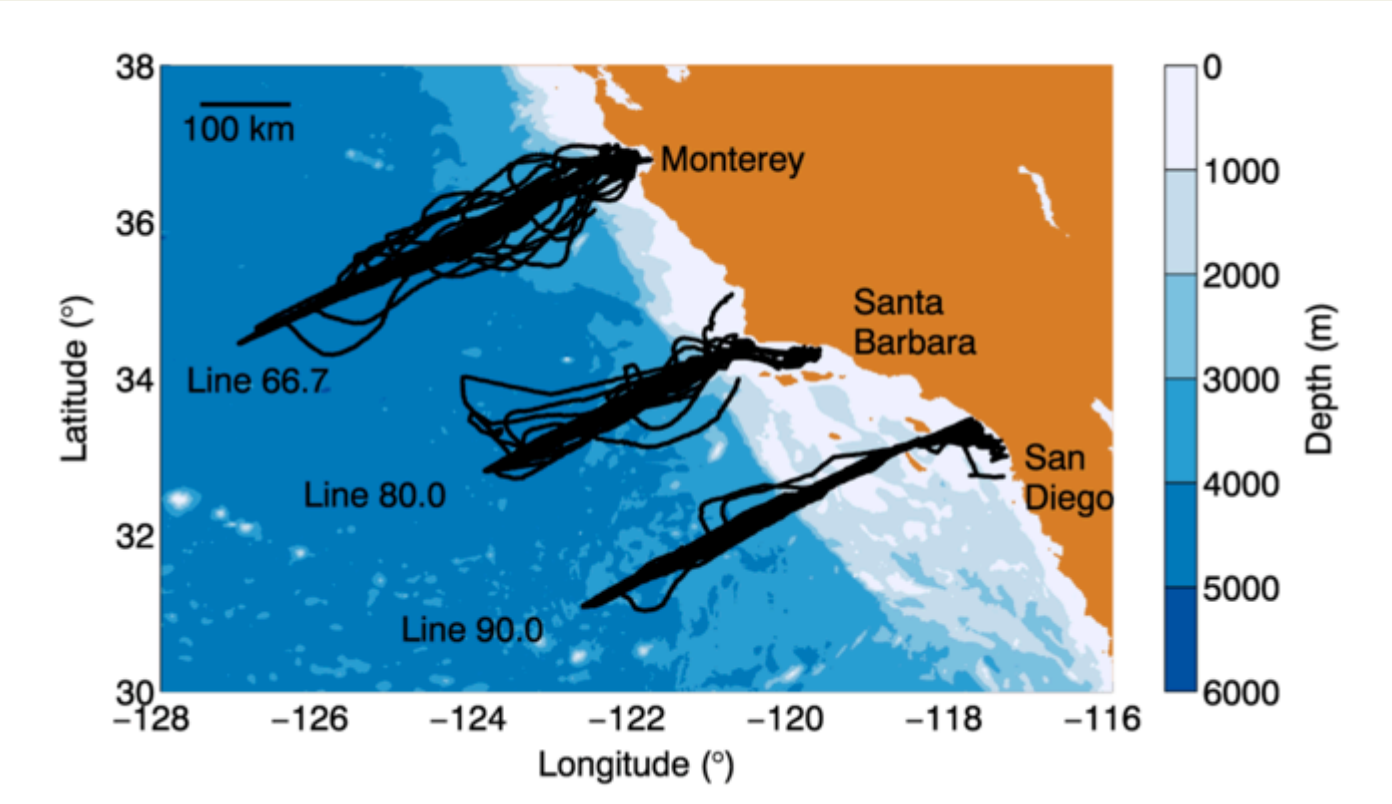
IOOS Nearshore Condition Updates



SCCOOS REGION: The Pacific Warm Anomaly/Marine Heat Wave

Spray Gliders
http://www.sccoos.org/data/spray/

Zaba and Rudnick, ***GRL*** (2016) analyzed glider transects from **Oct 2006 – June 2015**



SCCOOS REGION: The Pacific Warm Anomaly/Marine Heat Wave

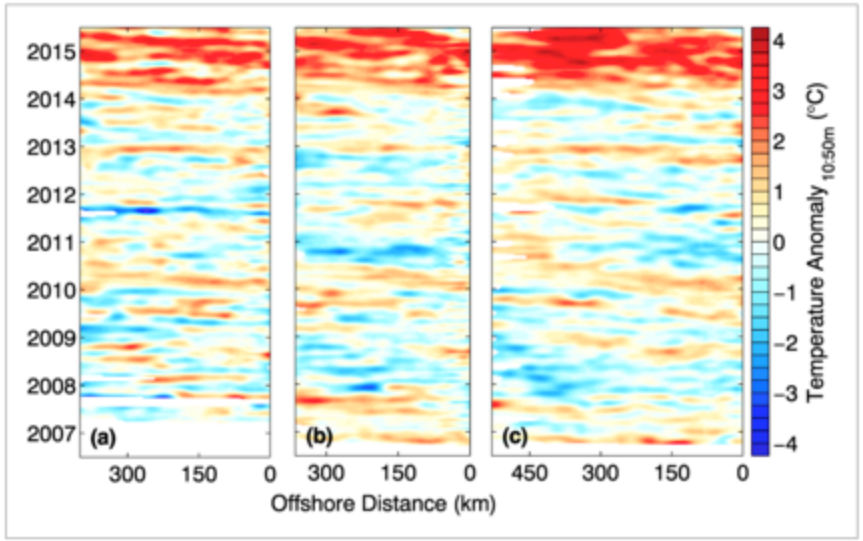


Figure 2. Open in figure viewer | Download Powerpoint slide

Hovmöller plots of temperature anomalies depth averaged over 10–50 m along (a) line 66.7, (b) line 80, and (c) line 90. A striking upper ocean temperature anomaly began in early 2014 and remained through mid-2015.

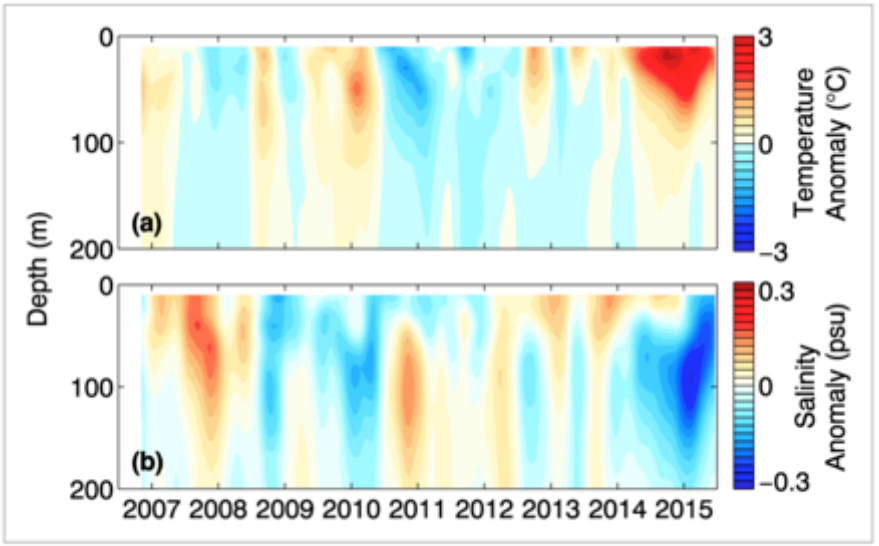
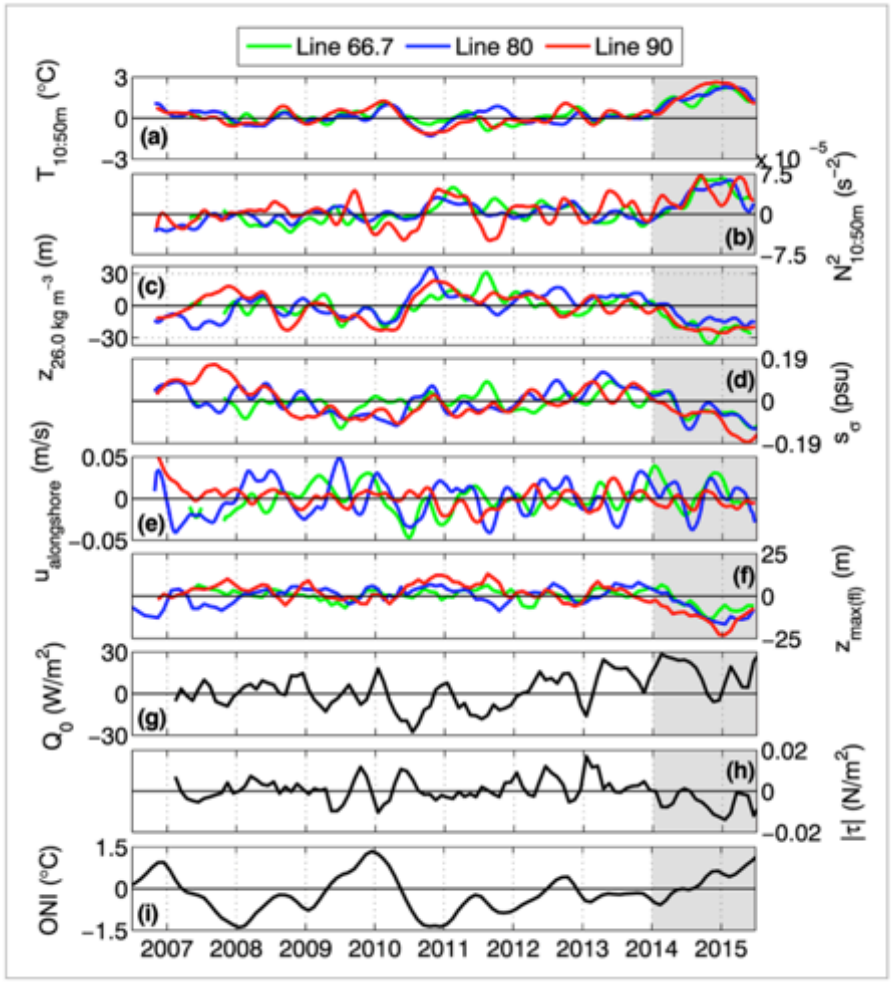


Figure 3. Open in figure viewer | Download Powerpoint slide

Depth-dependent (a) temperature and (b) salinity anomalies averaged over the inshore 200 km along line 90 and filtered with a 3 month running mean. A surface-intensified warming and a subsurface freshening persisted during 2014–2015.

Zaba and Rudnick (2016)

SCCOOS REGION: The Pacific Warm Anomaly/Marine Heat Wave



Time series of oceanic and atmospheric property anomalies. Glider-measured (a) temperature in the upper 50 m, (b) buoyancy frequency squared in the upper 50 m, (c) depth of the 26.0 kg/m^3 isopycnal (negative indicates deep), (d) salinity along isopycnals (the 25.75, 25.50, and 25.25 kg/m^3 isopycnals for lines 66.7, 80, and 90, respectively), (e) alongshore velocity depth averaged over the upper 500 m, and (f) depth of the subsurface fluorescence maximum (negative indicates deep). The glider-measured anomalies (Figures 4a–4f) are averaged along the inshore 200 km of lines 66.7 (green), 80 (blue), and 90 (red). NAM model (g) net surface heat flux (positive indicates downward) and (h) wind stress magnitude are averaged over the oceanic domain of Figure 1 ([−128°, −116°W] × [30°, 38°N]), i.e., data above land are excluded from the spatial average. In Figure 4i Oceanic Niño Index, ONI, shows equatorial SST anomalies averaged over the Niño 3.4 region. All spatially averaged anomalies are filtered with a 3 month running mean. The temporal range of the recent anomalous period is shaded in grey.

Cyclonic circulation weakened the climatological upwelling favorable winds

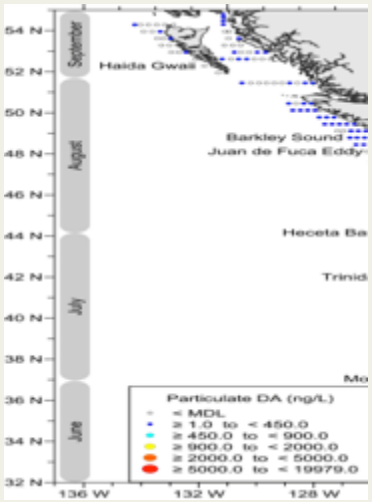
↓ winds
↓ upper-ocean mixing
↓ seasonal upwelling

↓ low-level cloud clover
↑ downward short-wave radiation at surface
↑ SST + feedbacks

Zaba and Rudnick (2016)

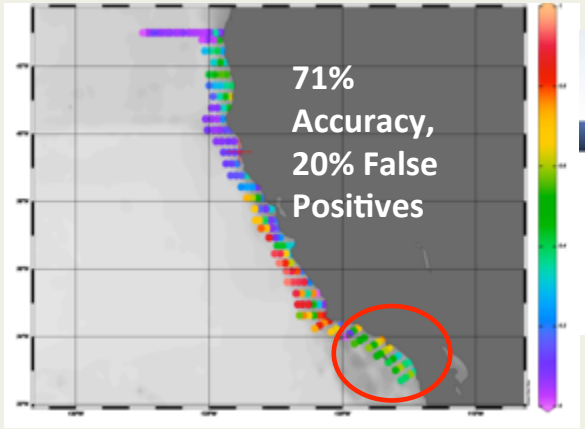
SCCOOS REGION: Marine Heat Wave + Massive HAB of 2015

The pre-operational C-HARM system provides a nowcast, 3-day forecast and hindcast of *Pseudo-nitzscha* blooms, Particulate Domoic Acid, and Cellular Domoic Acid



NWFS cruise, June-Sept 2015

C-HARM ESTIMATES AT CRUISE STATIONS

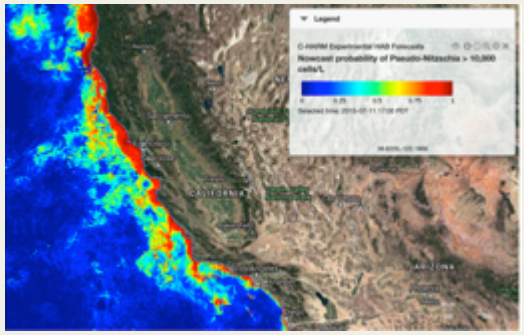


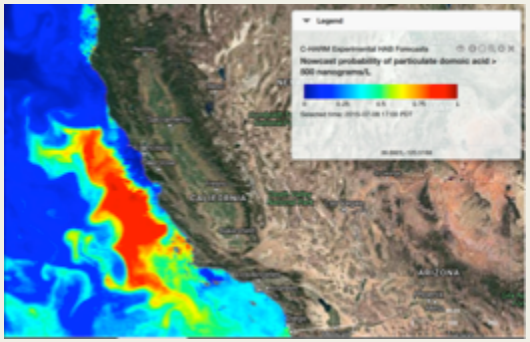
Dungeness Crab Closure!
Recreational and Commercial Harvests
(Nov-May)


Santa Cruz Sentinel
NEWS
News Sports Business Entertainment Lifestyle Opinion Obituaries Place
Home News
California's crab-season delay claims Christmas
By Aaron Kinney akinney@bayareanewsgroup.com



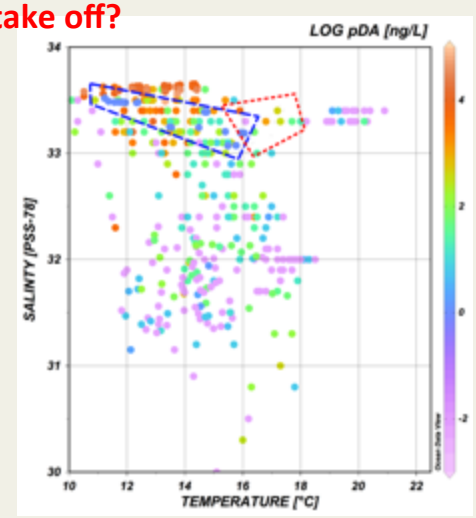
Why no toxic event in Southern California?





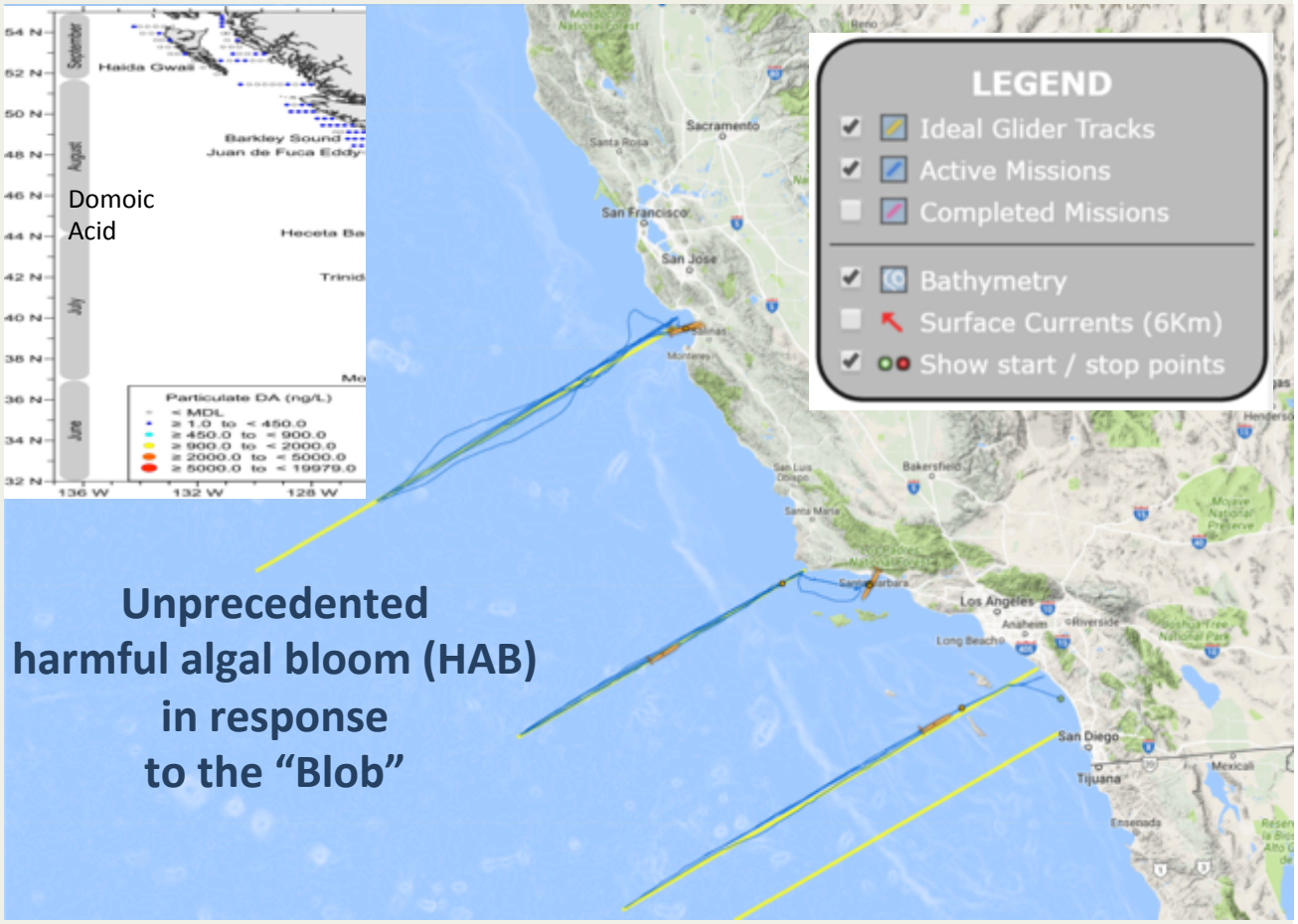
SCCOOS REGION: Marine Heat Wave + Massive HAB of 2015

Was it too hot in Southern California for the massive HAB to take off?

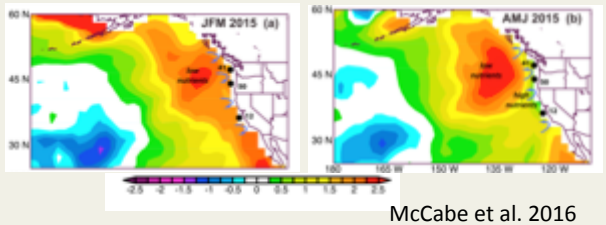


CalCOFI & SCCOOS Stations

The blue dashed polygon shows the T-S space (0-10 m) for CalCOFI Line 80 (Santa Barbara) immediately after the Spring Transition, while the red polygon shows the T-S space for Line 90 (SoCal). As the season progressed those regions warmed. **No cells, no bloom.**



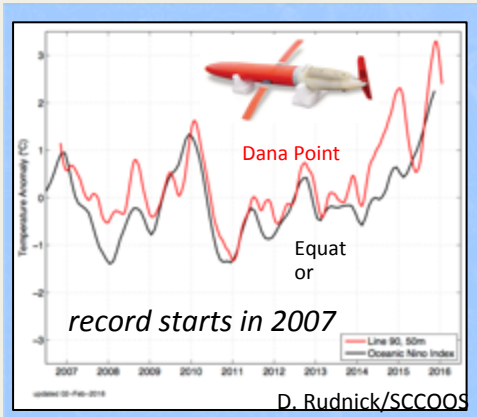
SCCOOS REGION: Marine Heat Wave & transition to El Niño



McCabe et al. 2016

Pacific Warm Anomaly Workshop
Scripps Institution of Oceanography
May 2015, hosted with West Coast Coastal Observing Systems





D. Rudnick/SCCOOS

Gliders measured anomalous temperatures in the Southern California Bight during 2014-2016

***captured ENSO signal in early 2016**

Regional Impacts Summary

Reporting Status:

- Restarted collection
- 43 entries since June 1, 2016

Environmental Conditions

- Wildfire
- Floods
- Drought
- Atmospheric river storms
- Widespread dead trees
- Domoic acid
- Anomalously warm oceanic waters

Human & Environmental Impacts

- Property damage/Loss of property
- Loss of life
- Nine fishery disasters declared
- Delayed fishery openings
- Reduced fishery quotas
- Impacts to recreational access
- School & business closures
- Evacuations
- Forest industry profit
- Increased human health risks
- Increased risk of wildfire
- Endangered species population decline
- Increased cost of emergency response

Impacts in Pictures

Erskine Fire, one of 33 California fire complexes in 2017, destroyed 285 homes and killed 2. Fires raged in at least 7 Western States in August 2016.



Impacts in Pictures

More than 102 million dead trees now litter California's forests, in large part due to the state's ongoing drought conditions.



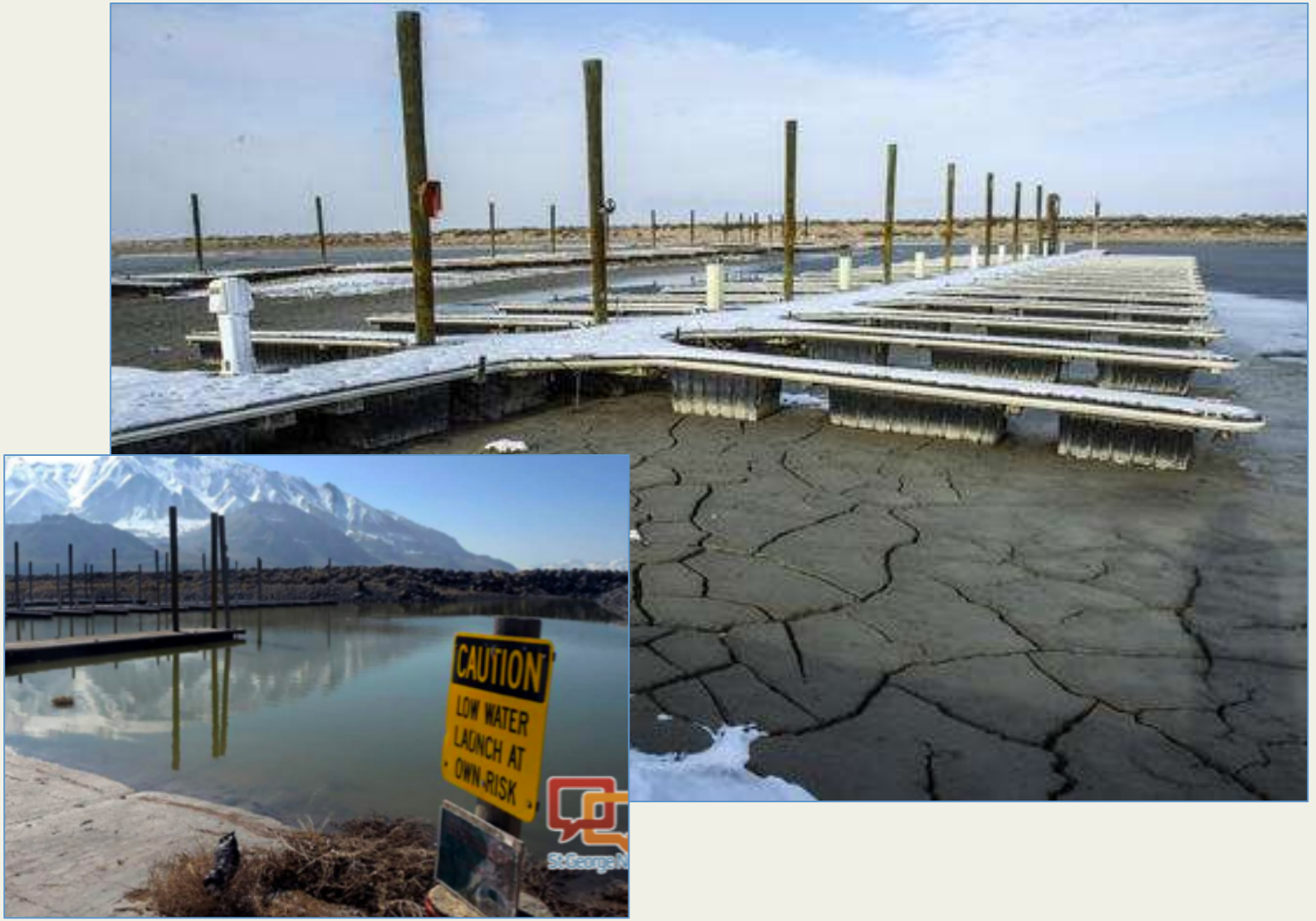
Impacts in Pictures

Lake Cachuma in Santa Barbara California, was down to an all-time-low of 7% capacity in summer 2016. Recent rains have increase capacity to 9% as of January 21, 2017 but it remains the driest in the state.



Impacts in Pictures

The Great Salt Lake, key to the Utah's economy and identity, is skirting record low levels after years of below-average participation and record heat.



Impacts in Pictures

"Pioneer Camp Tree" – beloved drive-through tree – was toppled in January 2017 storm.



2014



2017

Impacts in Pictures

An atmospheric river storm in early Jan 2017 brought high water and mudslides to much of California and Nevada. This Hollywood Hills home lost part of its foundation to the slides.



Impacts in Pictures

Recession of California's largest lake, the Salton Sea, is exposing thousands of acres of toxic salt flats. Dust created by high winds threaten to increase already high rates of asthma and other respiratory diseases in this economically impoverished area.



Impacts in Pictures

The recreational season for red abalone fishing in N. coast of California has been shortened and the take limit reduced for 2017. Surveys show that deeper populations have declined due to declining kelp forests and competition from purple sea urchins.



Impacts in Pictures

The opening of the 2016-2017 Washington and Oregon Dungeness crab fishery in Washington was delayed several weeks due to high levels of domoic acid measured in several locations.



Announcements & Open Discussion

1. Next NOAA West call: Monday March 20, 1pm PT
2. Open Discussion