

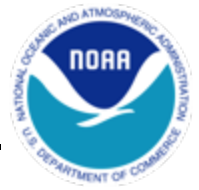


# North Atlantic El Niño Resources Webinar

North Atlantic Regional Team  
January 28, 2016

# Call Agenda

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- Regional Collaboration & NOAA In-Reach, Jason Tuell, Regional Team Lead
- El Niño in the North Atlantic, Art DeGaetano, Northeast Regional Climate Center
- NOAA El Niño Resources & Coordination, Ellen Mecray, Eastern Regional Climate Services Director
- New York/New England perspective on ENSO impacts on precipitation and flood potential, David Vallee, Northeast River Forecast Center
- Discussion

# Why Regional Collaboration?



## Regional Collaboration Mission

*To identify, communicate, and respond to regional needs, catalyze collaboration and connect people and capabilities to advance NOAA's mission and priorities.*

### Line of Sight:

COMMERCE  
Strategic goals

NOAA  
Top priorities for 2014-2016

NOAA  
Regional Collaboration Goals

GOAL 5 OPERATIONAL EXCELLENCE  
Deliver better services, solutions,  
and outcomes that benefit the  
American people

ACHIEVE ORGANIZATIONAL  
EXCELLENCE

Address regional challenges by  
connecting people and resources

Focus on people, teams and tools  
to advance organizational  
excellence

Exchange both national and  
regional insights that inform action

OBJ. 5.1: Strengthen organizational  
capabilities to drive customer-  
focused, outcomes-driven mission  
performance

Improve the understanding of and  
respect for NOAA's broad mission  
and regional capabilities<sub>3</sub>

# NART members



**Betsy Nicholson,**  
NOS/OCM



**Beth Turner**  
NOS/NCCOS



**Colleen Coogan**  
NMFS/GARFO



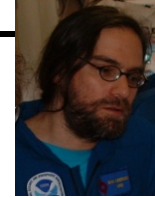
**Sylvain DeGuise**  
OAR/CT Sea Grant



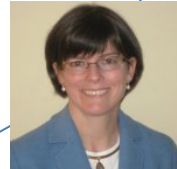
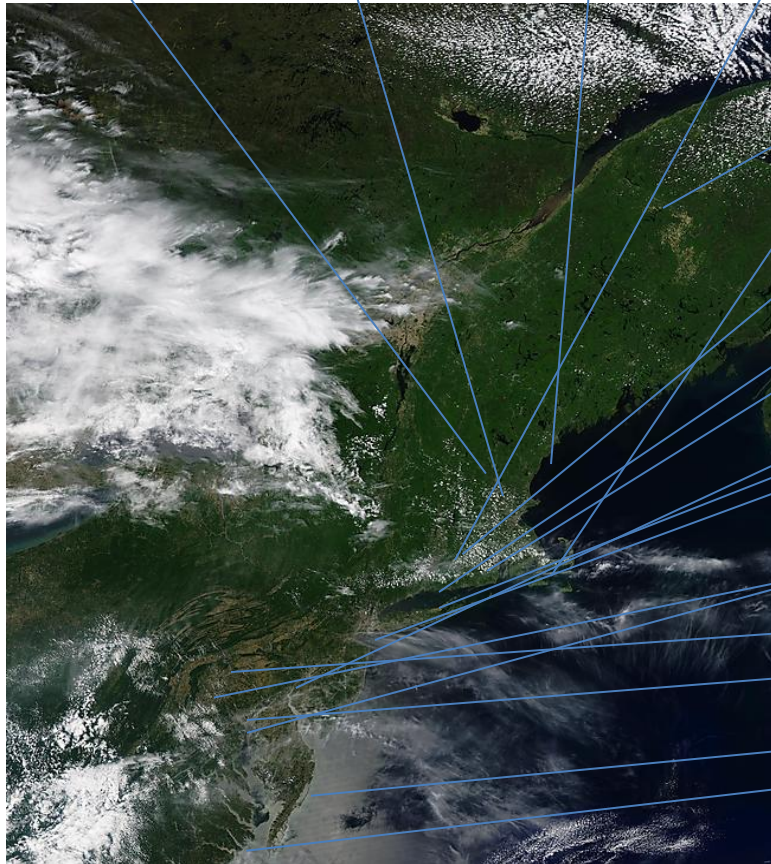
**Nicole Bartlett**  
NART Coordinator



**Rich Okulski**  
NWS/Caribou  
WFO



**Sim Aberson**  
OAR/AOML



**Ellen Mecray**  
NESDIS/NCEI



**Catalina  
Martinez**  
OAR/OER



**Kim Hyde**  
NMFS/NEFSC



**Kevin Schabow**  
NMFS/NCBO



**Jason Tuell**  
NWS/ER



**George McKillop,**  
NWS/ER, HSD



**Beth  
Phelan**  
NMFS/  
NEFSC



**Randy Schneider**  
NOS/OCM



**Troy Hartley**  
OAR/VA Sea Grant



**Simeon Hahn**  
NOS/OR&R



**Jen Dopkowski**  
OAR/CPO

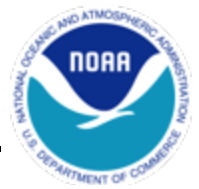


**Paul Ticco,**  
NOS/ONMS



**Joe Sienkiewicz**  
NWS/NCEP





# El Niño in the press



tatoedSailor

Mar 7, 2014

"A strong El Niño, by contrast, tends to push the southern stream even further north, and with it, milder air. Some of the most snow barren winters in the northeast have occurred during these winters."

Snow barren...northeast? YOU ROCK Niño!

## Did El Nino Make This Weekend's Colossal Snowstorm Worse?

ALEX BEAM

### Beware . . . El Niño is coming!

## Eye On Weather: El Niño A Big Player In Winter Outlook

By: Chief Meteorologist Eric Fisher

# El Niño watch issued: What could that mean for NJ?

## Enjoy the warmth while you can – we could still get blizzards

SCIENCE WEATHER

### Here's Why the East Coast Has Been So Warm

Kevin Worland @jdworland | Dec. 14, 2015



You can forget about a white Christmas if you live on the East Coast



Gunny

El Niño = El BS' O.

Mar 7, 2014

Winter Preview: El Niño contributes to a tale of two seasons



THE WEATHER

### Super El Niño Means Less Snow, Warm Weather for Northeast

Friday, December 18, 2015, by Megan Barber



Webcam Image from Dec. 15 Camelback, Pennsylvania

- KILLINGTON
- MAD RIVER GLEN
- NEW ENGLAND
- STOWE
- STRATTON
- SUGARBUSH
- SUGARLOAF
- EL NIÑO
- NEW ENGLAND SKIING
- NORTHEAST
- THE WEATHER

1 COMMENT

Like 138

### US Winter Forecast: Northeast to Dodge Winter's Brutal Cold; Rain, Snow to Dent California Drought

By Jillian MacMath, AccuWeather.com Staff Writer  
October 16, 2015; 4:04 AM ET

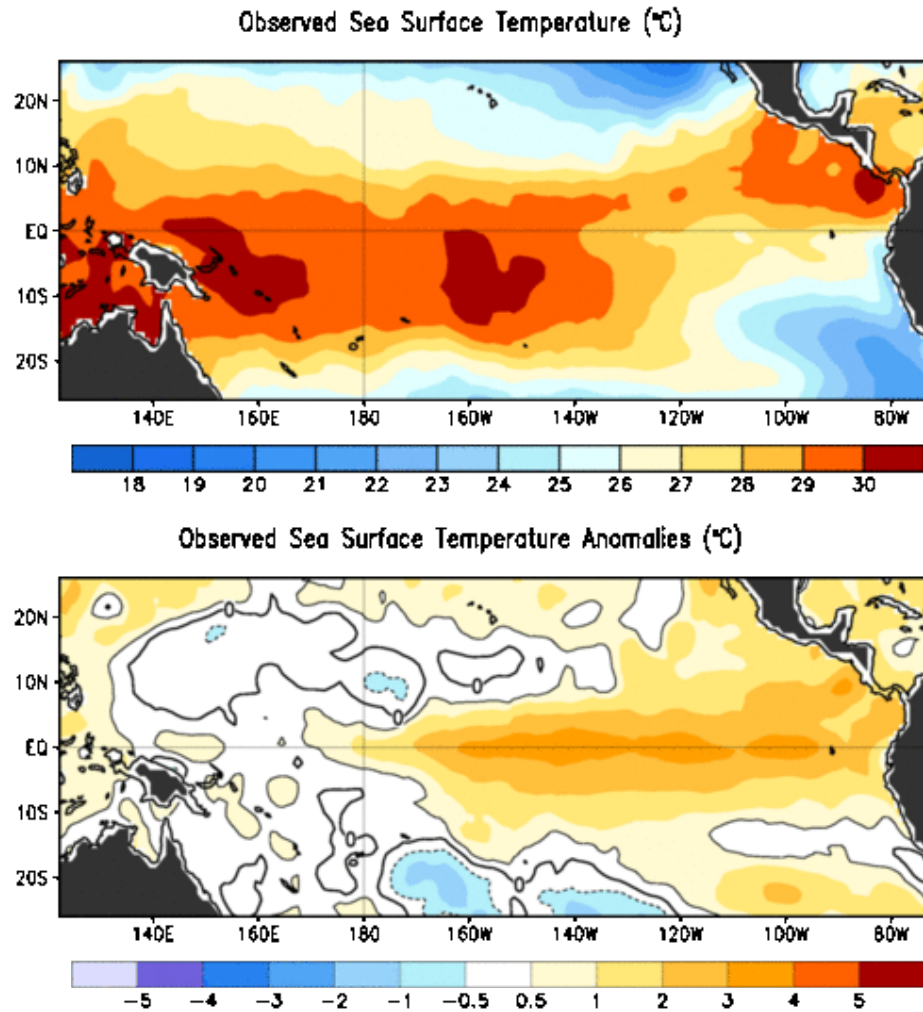
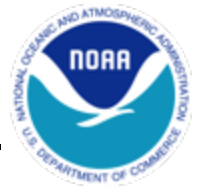




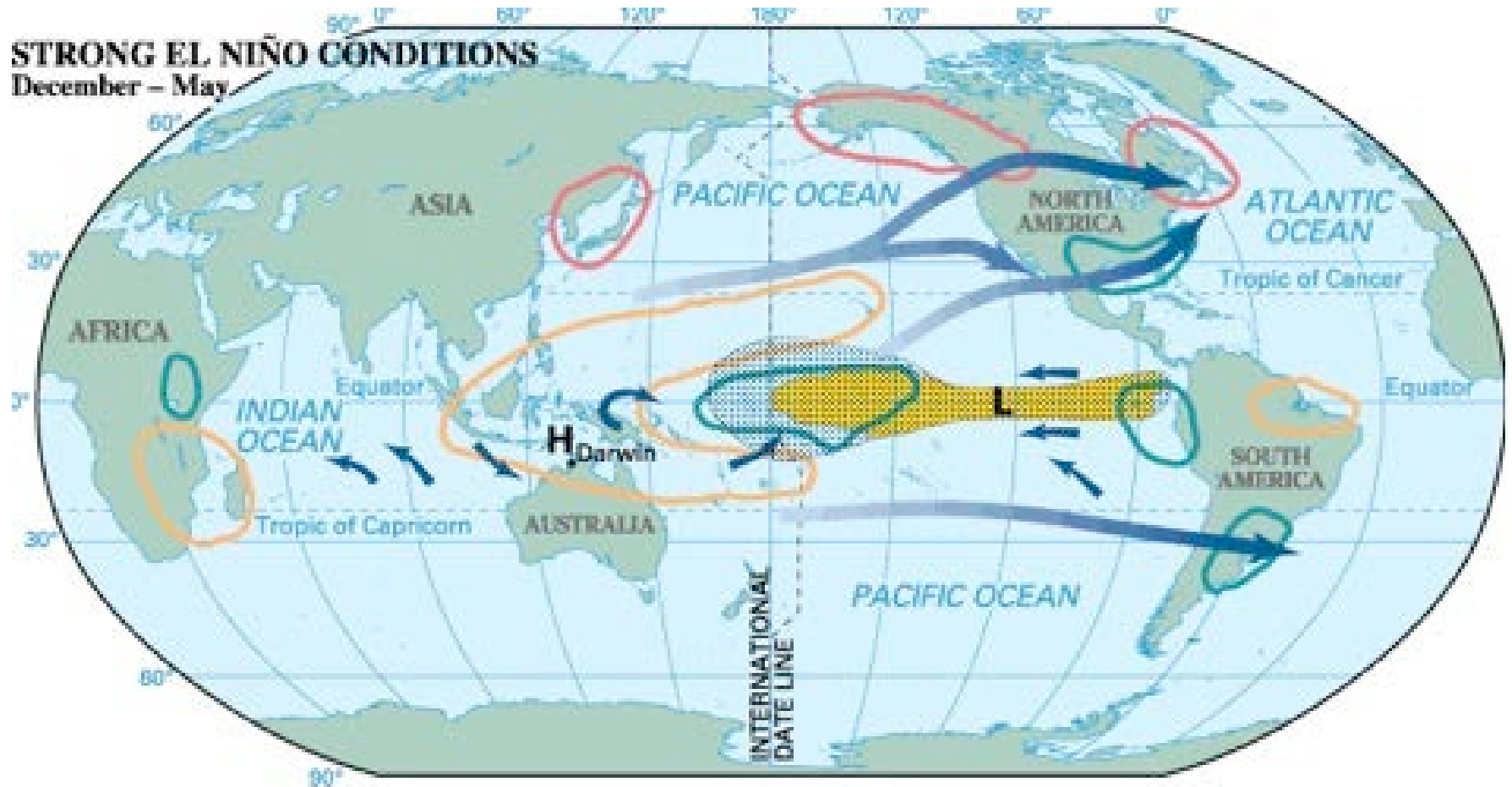
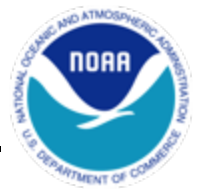
# El Niño in the North Atlantic

Art DeGaetano, Director  
Northeast Regional Climate Center  
**January 28, 2016**

# What is El Niño... Current Status

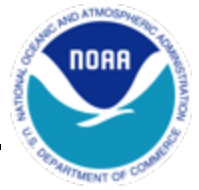


# Pacific to North Atlantic

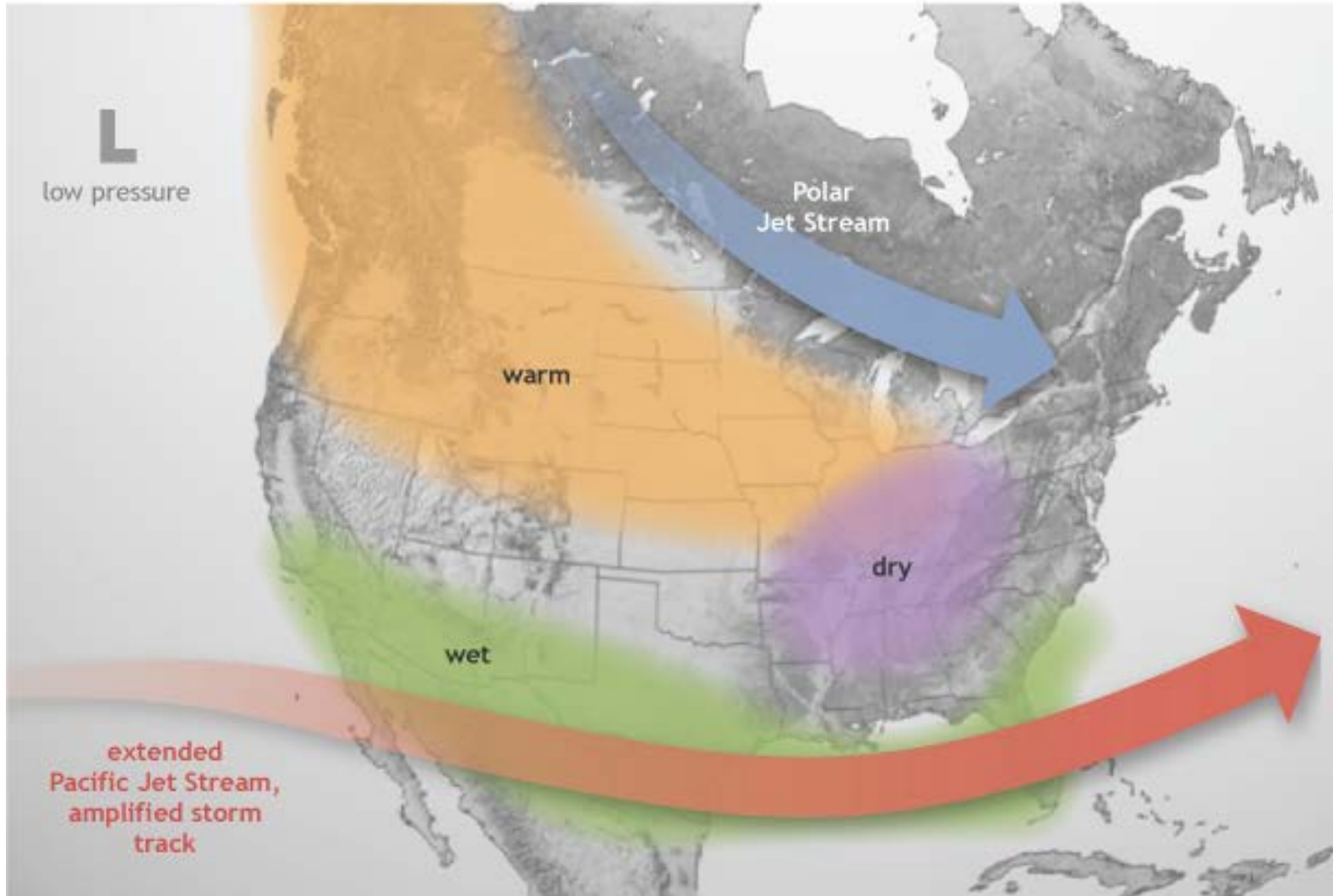




# A Typical El Niño pattern



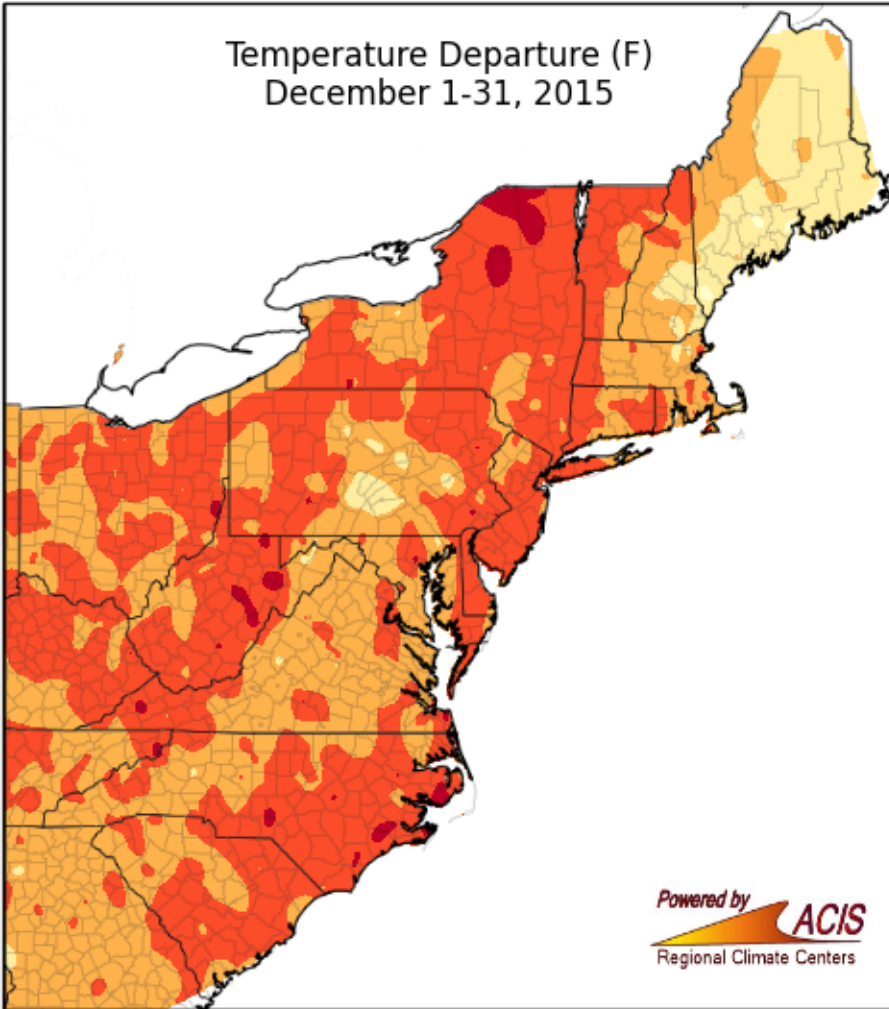
Wintertime El Niño pattern



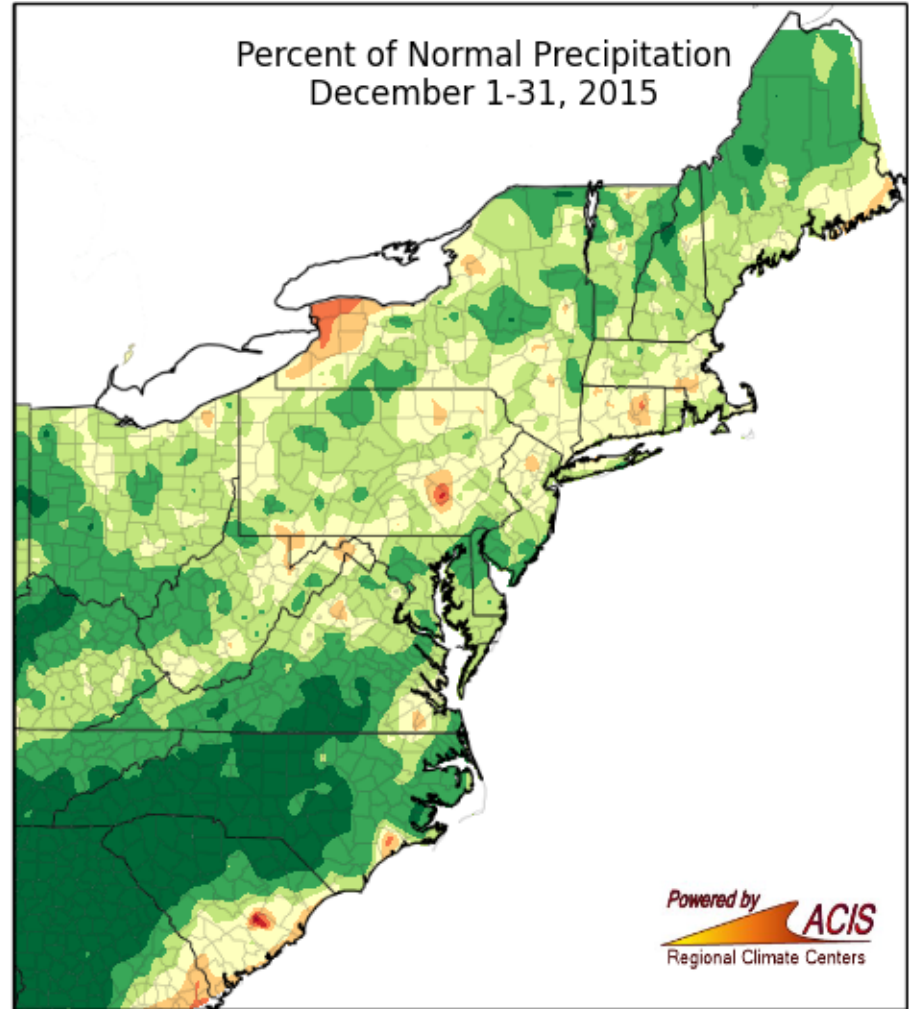
# This December...El Niño?



Temperature Departure (F)  
December 1-31, 2015

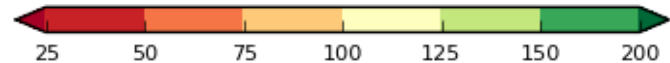
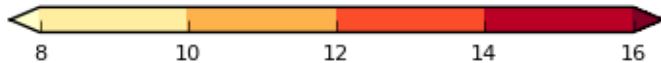


Percent of Normal Precipitation  
December 1-31, 2015



Powered by **ACIS**  
Regional Climate Centers

Powered by **ACIS**  
Regional Climate Centers



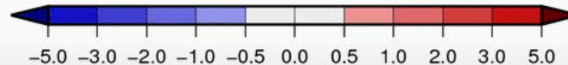
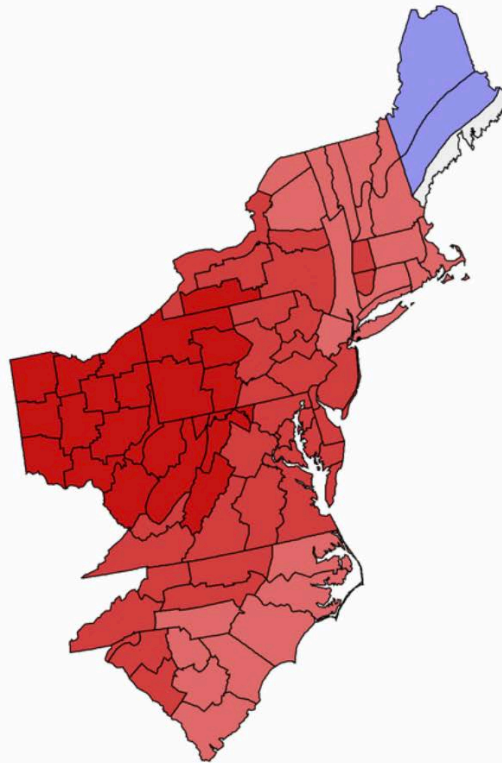
# Classic Strong El Niño Analog



Data Set:  Variable:   
Region:  Time Period:  [View Map](#)

## Strong El Niño Mean Temperature Departure from Average

National Weather Service Eastern Region  
Composite: December 1957, 1965, 1972, 1982, 1991, 1997  
Average Period: 1981-2010







## Potential Winter Impacts

### Coastal Storms



Several research studies have noted an increased frequency of East Coast storms during El Niño winters. These storms, known as nor'easters, have a number of coastal impacts, ranging from beach erosion and high winds to heavy snowfall and precipitation. Storms that follow a classic nor'easter

### Snowfall



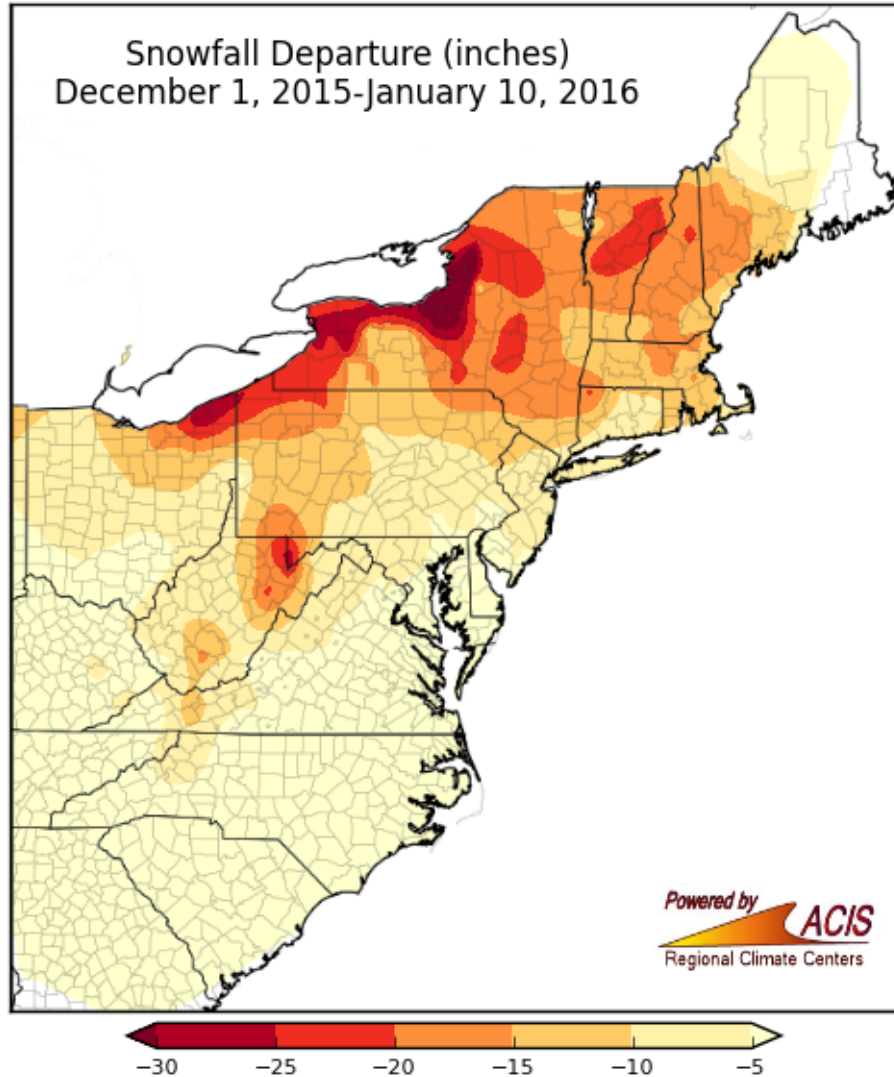
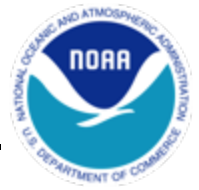
Snowfall along the Northeast coast is typically above average during El Niño winters. The exception to this is the lake-effect region in New York. Since 1950, six of the least snowy winters on record at Buffalo have occurred during El Niños. Typically, in regions closer to the coast, December through February snowfall is as

### Energy Usage



Across a broad swath of the Southeast, El Niño winter temperatures average 1 to 2 degrees cooler than those that do not experience El Niño conditions. Therefore, heating degree day accumulations tend to be higher during El Niño winters in this region. The [Residential Energy Demand Temperature Index \(REDTI\)](#) provides a

# El Niño and Winter Snow

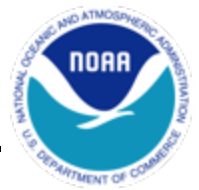


Since 1950, during El Niño

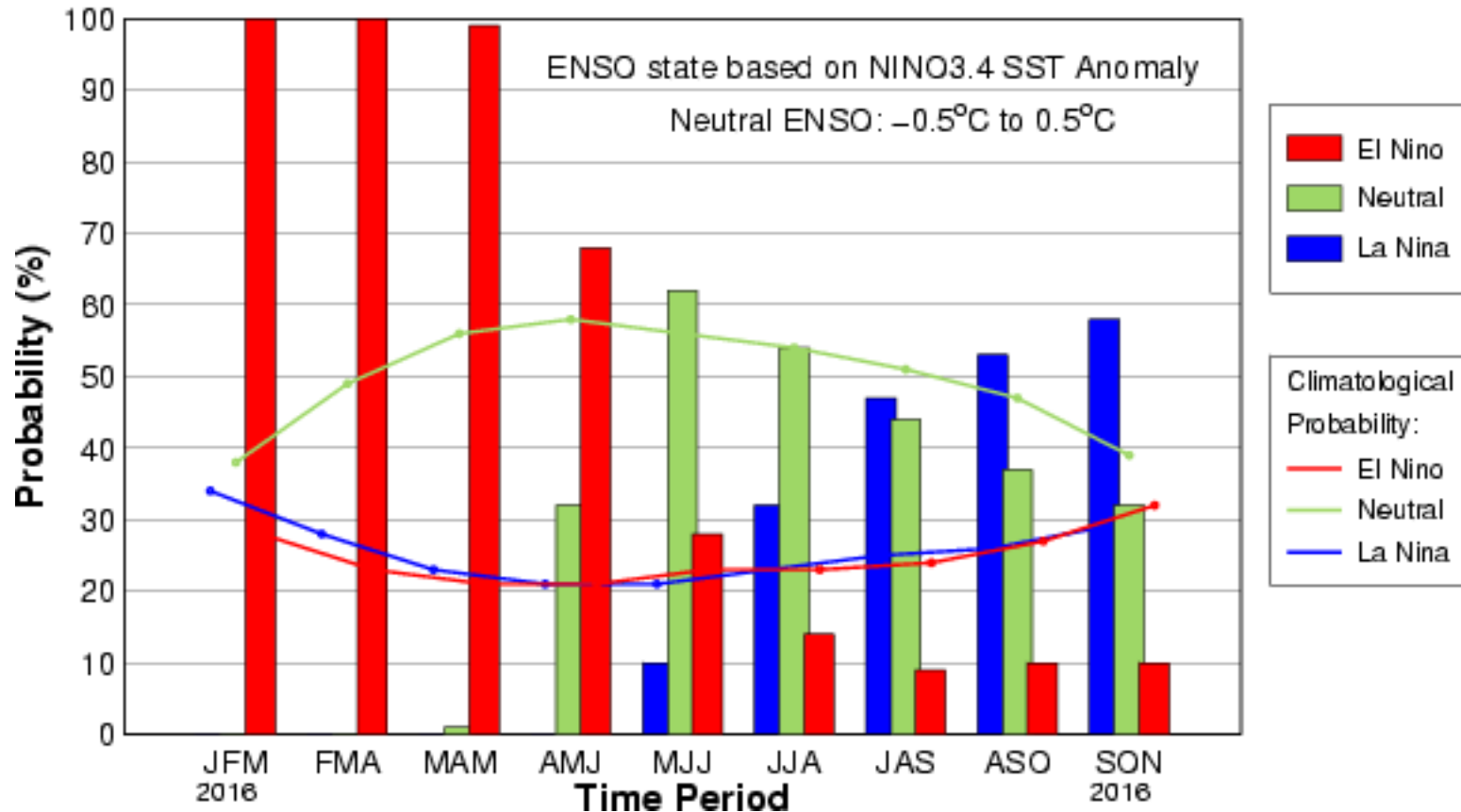
6 of the least snowy winters at Buffalo.

8 of the 10 greatest 2-day snowfalls at Washington, DC.

# El Niño Forecast

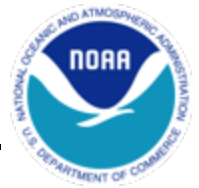


## Mid-Jan IR/CPC Plume-Based Probabilistic ENSO Forecast



ENSO likely to continue strengthening and to last through the winter of 2015-16

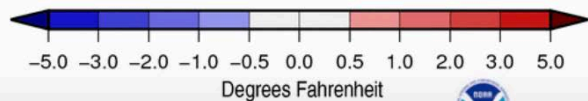
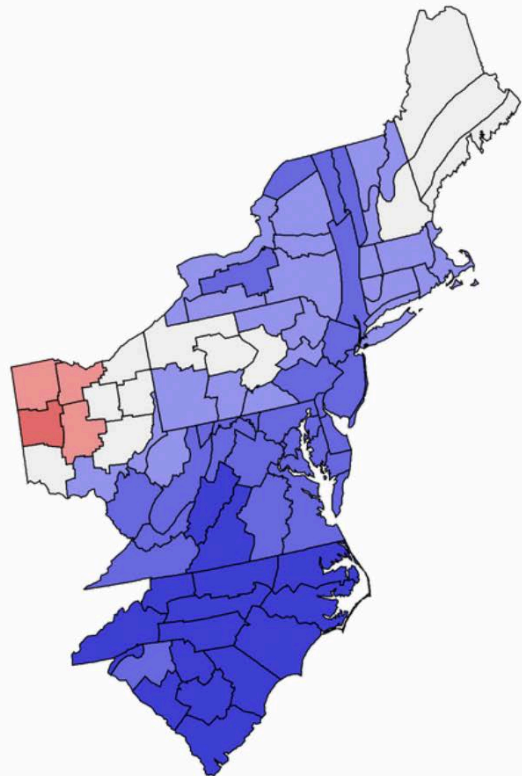
# El Niño ... February during strong El Niño



Data Set:  Variable:

Region:  Time Period:

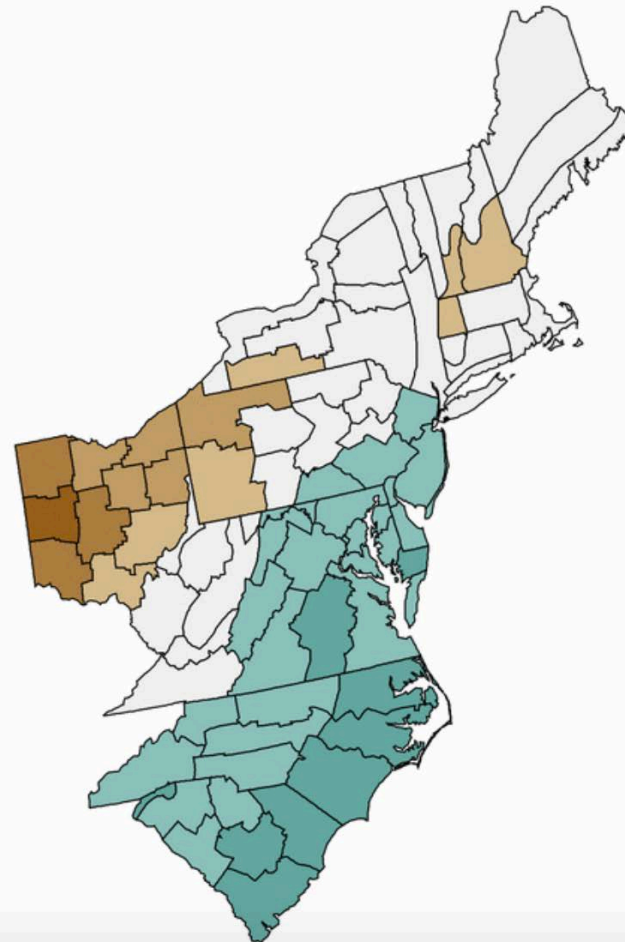
**Strong El Niño Mean Temperature Departure from Average**  
National Weather Service Eastern Region  
Composite: February 1958, 1966, 1973, 1983, 1992, 1998  
Average Period: 1981–2010



Data Source: nClimDiv



**Strong El Niño Precipitation Percent of Average**  
National Weather Service Eastern Region  
Composite: February 1958, 1966, 1973, 1983, 1992, 1998  
Average Period: 1981–2010







# NOAA El Niño Resources & Coordination

Ellen Mecray

NOAA Regional Climate Services Director- Eastern Region

**January 28, 2016**

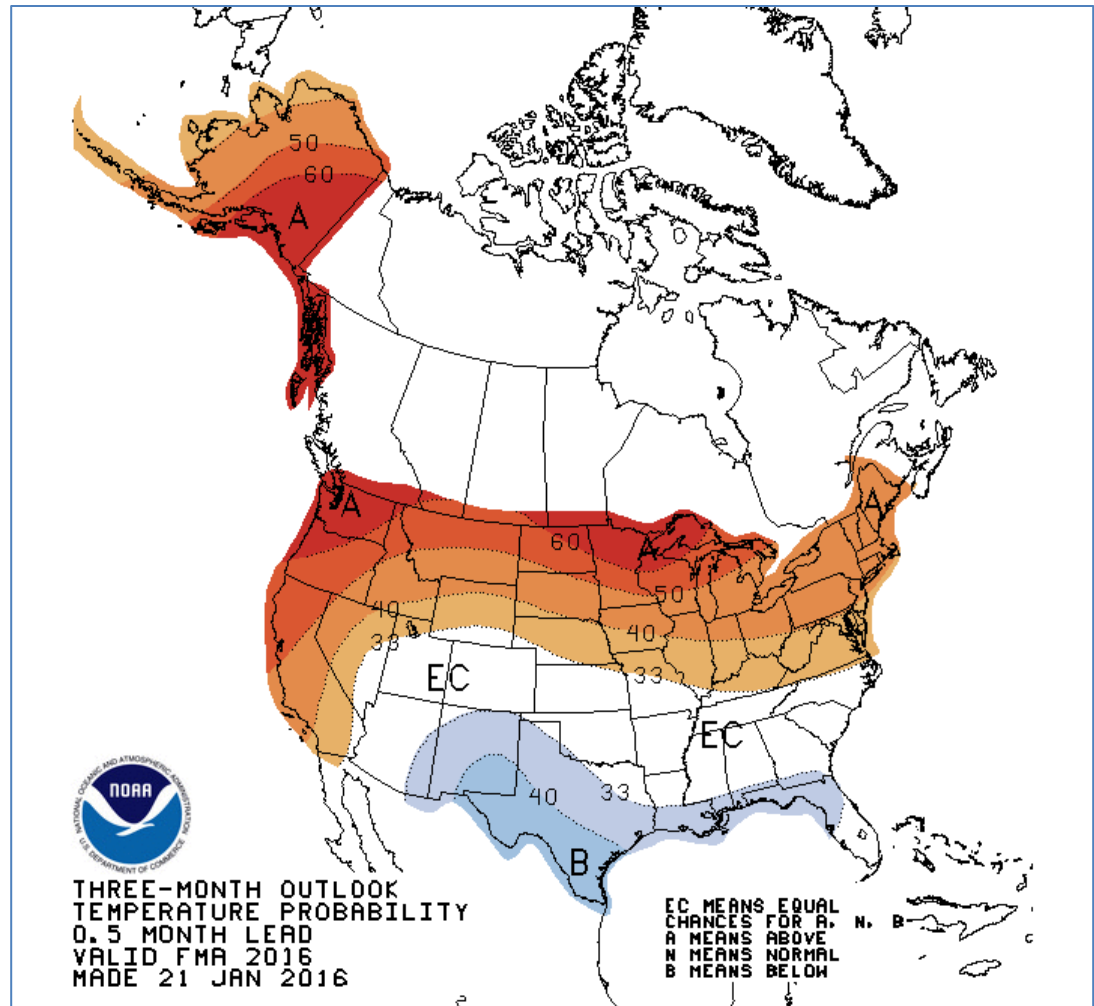
# National and International Resources: Outlooks and Forecasts

(CPC) ENSO Diagnostic Discussion  
[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/index.shtml](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/index.shtml)

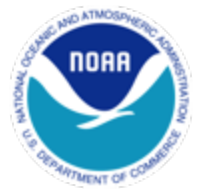
(CPC) El Nino – Southern Oscillation (ENSO)  
<http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml>

(CPC) Monthly and Seasonal Temperature, Precipitation, and Drought Outlooks  
<http://www.cpc.ncep.noaa.gov/>

IRI ENSO Forecast (International)  
<http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>



# National Resources: Historical Context and General Information



National Center for Environmental Information (NCEI) A Historical Perspective

[http://www.ncdc.noaa.gov/monitoring-references/dyk/el\\_nino-2015-2016](http://www.ncdc.noaa.gov/monitoring-references/dyk/el_nino-2015-2016)

Pacific Marine Environmental Lab (PMEL) El Niño Theme Page

[http://www.pmel.noaa.gov/tao/el\\_nino/nino-home.html](http://www.pmel.noaa.gov/tao/el_nino/nino-home.html)

(PMEL) El Niño Observing Systems

<https://www.youtube.com/watch?v=nzBAWirHMvA&feature=youtu.be>

(CPC) General Questions about ENSO

[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/ensostuff/ensofaq.shtml#general](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensofaq.shtml#general)

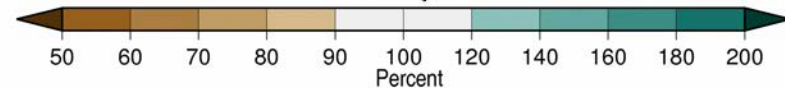
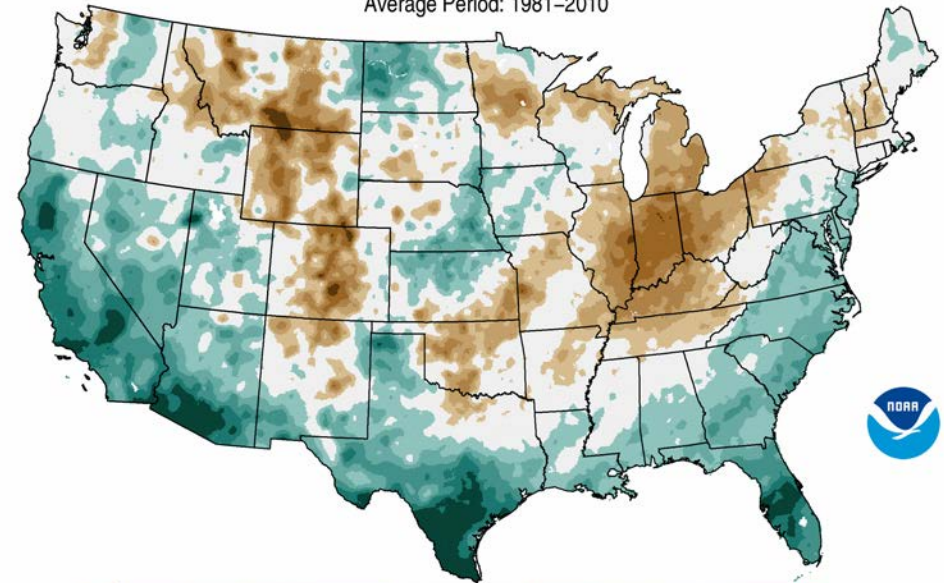
(PSD) Physical Sciences Division, risk of extremes during ENSO

<http://www.esrl.noaa.gov/psd/enso/climaterisks/>

## Strong El Niño Precipitation Percent of Average

Composite: February 1958, 1966, 1973, 1983, 1992, 1998

Average Period: 1981–2010



Data Source: 5km Gridded Dataset (nClimGrid)

Created by: National Centers for Environmental Information



# Regional Resources: North Atlantic Services

## NCEI – Regional El Nino Impacts & Outlook Assessments

<http://www.ncdc.noaa.gov/news/regional-el-nino-impacts-outlooks-assessments>

## Eastern U.S. Climate Summary and Outlook Webinars

<http://www.nrcc.cornell.edu/services/webinars/2015/12/index.html>

## Regional Climate Centers: Northeast

<http://www.nrcc.cornell.edu/>

## State Climatologists

<http://www.stateclimate.org>

## NWS Weather Forecast Offices El Niño Webpages and Resources e.g., Wichita

<http://www.weather.gov/ict/enso>

## Quarterly Climate Summaries/Outlooks (2 page Summaries):

<https://drought.gov/drought/resources/reports>

## Climate Information Dashboard:

<http://www.gulfofmaine.org/dashboard/>

### Quarterly Climate Impacts and Outlook

### Eastern Region September 2014

#### National - Significant Events for June–August 2014

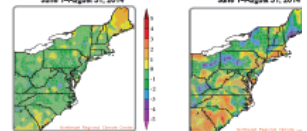


**Significant Events for August and Summer 2014**

- Heat waves in the Pacific Northwest (80°F+ for 5 days)
- Record-breaking heat wave in the Southeast (95°F for 5 days)
- Major wildfire in California (100,000 acres burned)
- Major earthquake in the Pacific Northwest (M 8.1)

#### Regional - Climate Overview for June–August 2014

**Temperature and Precipitation Anomalies**  
Departure from Normal Temperature (°F) | Percent of Normal Precipitation



The average summer temperature for the Eastern Region was 70.2°F, 0.4°F cooler than normal. Sixteen of the sixteen states saw below-normal temperatures. Maine, however, had its 15th warmest summer on record. June was warmer than normal for all states, with the region 1.0°F above normal. The states were cooler than normal during July, with the region 1.0°F below normal. Ohio and West Virginia had their 3rd and 15th coolest July on record, respectively, while Rhode Island had its 19th warmest July. The region ended August at 1.3°F below normal. Fifteen states were cooler than normal, with Virginia and North Carolina ending the month among their top 20 coolest.

Source: The Weather Service, National Oceanic and Atmospheric Administration

#### Highlights for the East

Severe storms struck the region throughout summer. Forty-eight tornadoes touched down, with the majority occurring in July. A tornado in Madison County on July 8 was the second deadliest to date in that state. A tornado in Suffolk County, MA, on July 28 was the first.

#### El Niño Impacts and Outlook

##### Typical El Niño Winter Pattern



The image above shows the typical pattern during El Niño winters. The polar jet stream tends to stay to the south of much of the Eastern Region, while an active track of jet stream is present across the southern U.S. Since much of the Eastern region lies between the two storm tracks, temperature and precipitation patterns vary considerably from south to north. It is important to note that this is a schematic diagram representing general patterns and is not created from field data. For more information, please visit: <http://www.elnino.gov/news/feature>

### Eastern Region October 2015

#### Potential Winter Impacts

##### Coastal Storms

Several research studies have noted an increased frequency of East Coast storms during El Niño winters. These storms, known as nor'easters, have a number of coastal impacts, ranging from beach erosion and high winds to heavy snowfall and precipitation. Storms that follow a classic nor'easter track from south of Cape Hatteras along the East Coast are the main contributor to this increase. Metch et al. (2002) found an additional two storms with this track occur during El Niño winters compared to other winters. Strong El Niño events are particularly associated with this increase. Significant snow storms such as the Blizzard of '58 and a second March 1956 nor'easter occurred in conjunction with El Niño conditions. As did the February 2003 President's Day Storm. Storms such as the "Perfect Storm" occurred in 1991, resulting in 15 to 30 foot waves to coastal New England during a strong El Niño.

##### Snowfall

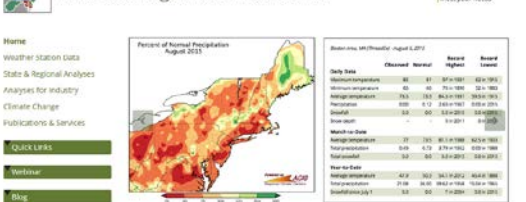
Snowfall along the Northeast coast is typically above average during El Niño winters. The exception to this is the lake-effect region in New York. Since 1950, six of the ten greatest snow accumulations have occurred during El Niño. Typically, in regions closer to the coast, December through February snowfall is as much as 6 inches greater during such winters. However, individual storm tracks can influence where precipitation falls as rain versus snow. Heavy East Coast snowfalls have occurred under El Niño conditions. Seven energy consumption increases as the number of heating degree days increases, this winter's El Niño is likely to increase energy usage as the demand for heating will be above average. With warmer than normal temperatures more likely in the Northeast, energy consumption will likely be lower, which is reflected in historical RDETI values during El Niño in this region.

##### Energy Usage

Across a broad swath of the Southeast, El Niño winter temperatures average 1 to 2 degrees cooler than those that do not experience El Niño conditions. Therefore, heating degree day accumulations tend to be higher during El Niño winters in this region. The Residential Energy Demand Temperature Index (RDETI) provides a population-weighted view of heating degree day accumulation in a region, thus giving a measure of year-to-year fluctuations in energy demand for residential heating. In the Southeast, seven of the ten highest RDETI values since 1950 have occurred under El Niño conditions. Since energy consumption increases as the number of heating degree days increases, this winter's El Niño is likely to increase energy usage as the demand for heating will be above average. With warmer than normal temperatures more likely in the Northeast, energy consumption will likely be lower, which is reflected in historical RDETI values during El Niño in this region.

Source: The Weather Service, National Oceanic and Atmospheric Administration

### Northeast Regional Climate Center



#### WEBSITE HIGHLIGHTS

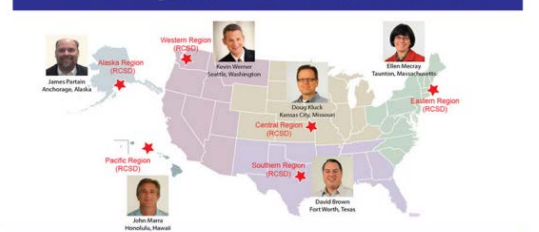
**January 2016 Blizzard**  
Snowfall map and 1-day and 2-day rankings.  
[Read more in the NRCC Blog.](#)

#### El Niño Outlook

The Eastern Region El Niño Impacts and Outlook features an overview of typical El Niño winter weather patterns, potential impacts, winter temperature and precipitation outlooks, and a comparison of the 2015-16 El Niño event to previous events.  
[Go to page.](#)



### NOAA's Regional Climate Services Directors



**Program Coordinator**  
Tamara G. Houston  
NOAA's National Climatic Data Center  
151 Patton Avenue  
Asheville, NC 28801



# New Services Resource:

## [Climate.gov/enso](https://www.climate.gov/enso)

A new, primary entry point for agency El Niño resources and information

Includes both national and regional information, and links to resources throughout NOAA

Communications materials appropriate for non-technical audiences

e.g., What is ENSO?

<https://www.climate.gov/news-features/blogs/enso/what-el-ni%C3%B1o%E2%80%93southern-oscillation-enso-nutshell>

e.g., Understanding El Niño

[https://www.youtube.com/watch?v=Tuou\\_QcglxI](https://www.youtube.com/watch?v=Tuou_QcglxI)  
and  
<http://oceantoday.noaa.gov/>

e.g., ENSO blog

<https://www.climate.gov/news-features/department/8443/all>

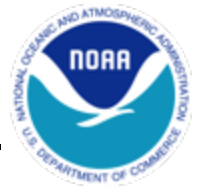
The screenshot shows the NOAA Climate.gov website's 'El Niño & La Niña (El Niño-Southern Oscillation)' page. The 'U.S. Impacts' tab is selected. A map of the United States is displayed with color-coded regions: orange for 'warmer' (Alaska, Pacific Northwest, Great Lakes), green for 'wetter' (Southwest, Southeast), and purple for 'drier' (Ohio Valley). A red arrow indicates the 'extended Pacific Jet Stream, amplified storm track' moving from the Pacific towards the Southeast. Text on the right explains that El Niño winters tend to be wetter and slightly cooler than average across southern states, warmer in the north, and drier in the Southeast. A 'More on this winter's outlook' section provides regional outlooks and links to winter outlook videos. A 'Typical U.S. impacts' section lists historical risks of seasonal extremes and winter weather.

The screenshot shows a news article on the Climate.gov website titled 'What is the El Niño-Southern Oscillation (ENSO) in a nutshell?'. The author is Michelle L'Heureux, and the article is dated Monday, May 5, 2014. A 'Print' button is visible. The article text begins: 'Go to any agency that is focused on weather or climate forecasting and you'll hear scientists buzzing to one another about "ENSO" (pronounced "en-so"). After glancing at the stereotypical scientist, you might immediately assume "En-so" is a Star Wars character, but you would be'. A 'Print' button is also visible at the bottom right of the article content.



# New York/New England perspective on ENSO impacts on precipitation and flood potential

David Vallee, Hydrologist-in-Charge  
NWS Northeast River Forecast Center  
**January 28, 2016**

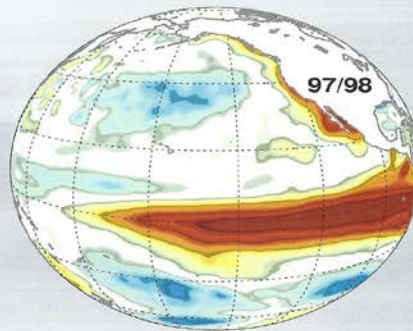
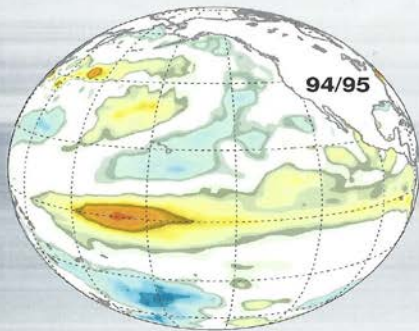
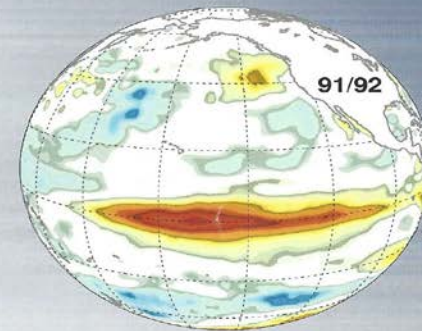
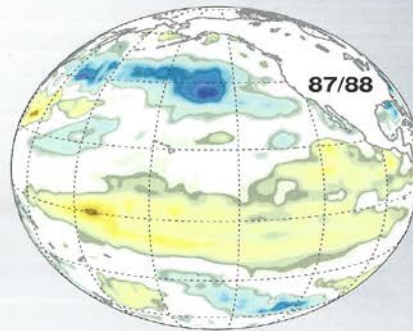
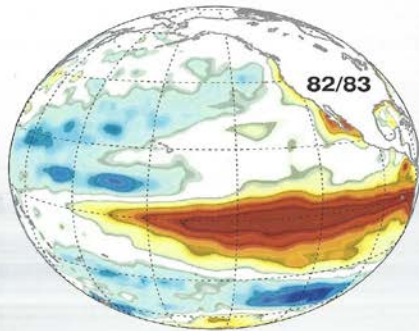
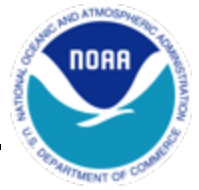


Local research initiative to better define possible sensible impacts on precipitation and flood potential (winter/spring) across the Northeast

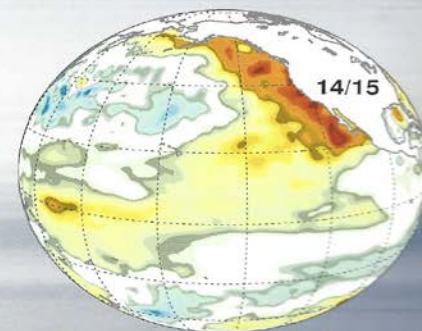
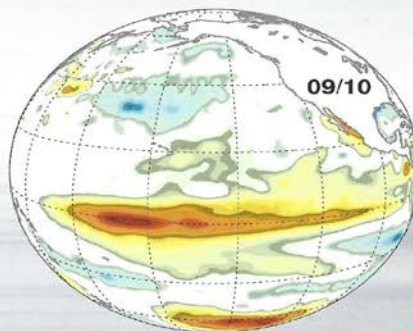
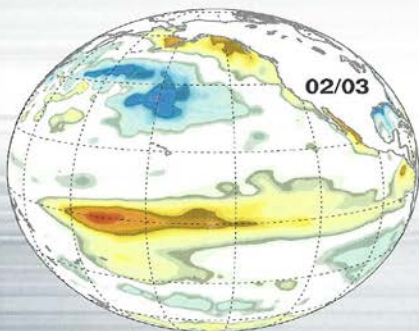
- Premise: strongest possible correlations exist with the most significant ENSO events
- Examined the top 5 warmest El Nino events
- Calculated 3 month precipitation totals and departures from normal
- Found several common themes
  - Dry late summer/fall
  - Wet late winter/spring
  - Increased spring flood potential
- \*One outlier year: 1965 – but the region was in the heart of its record 3 year drought!



# Lots of “Flavors” to ENSO



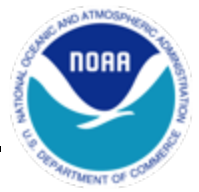
**FACES**  
— of —  
**ENSO**



Capotondi, A., et al, 2015: Understanding ENSO Diversity. *Bull. Amer. Meteor. Soc.*, 96, 921-933.

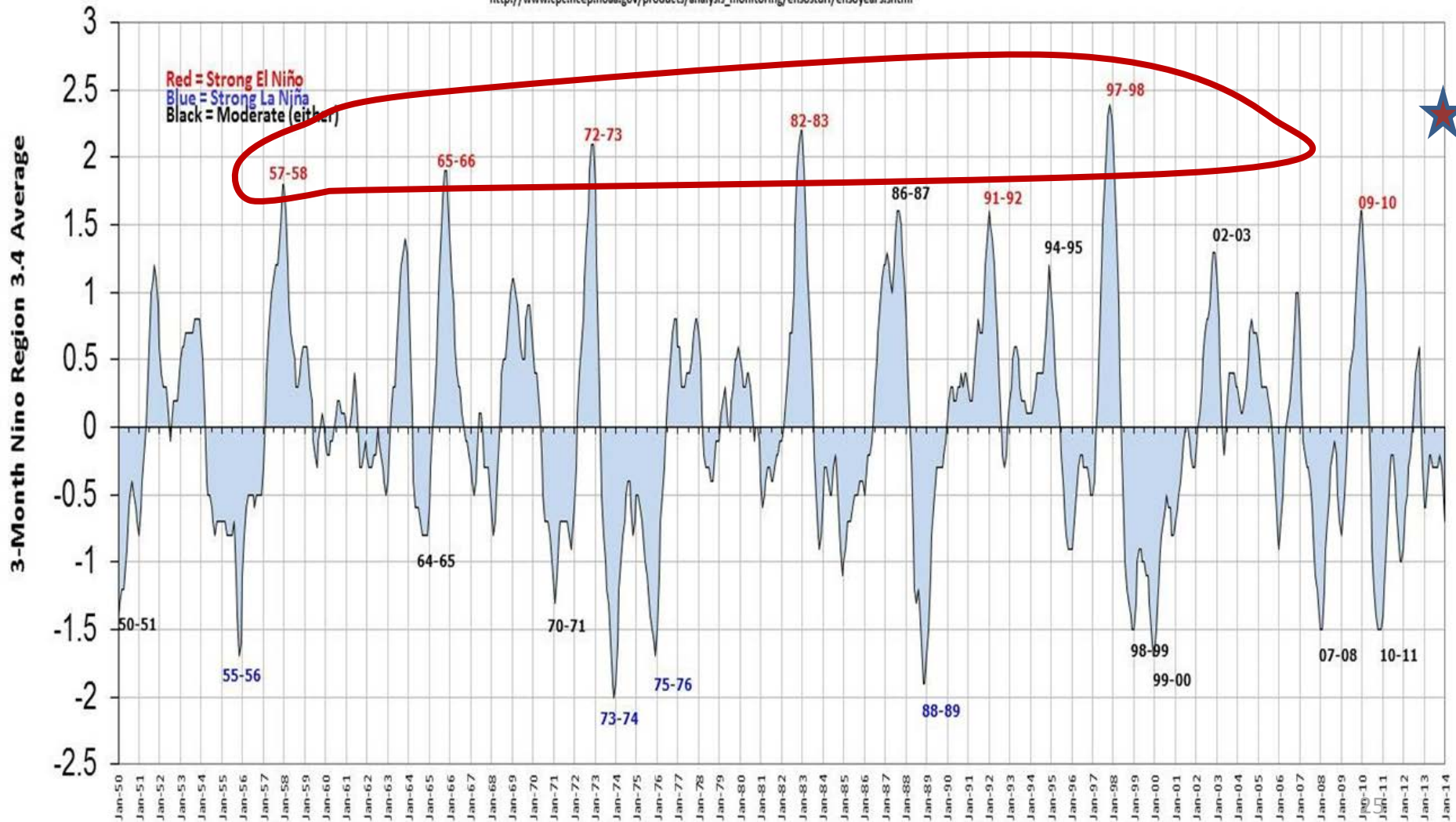


# The five most intense events

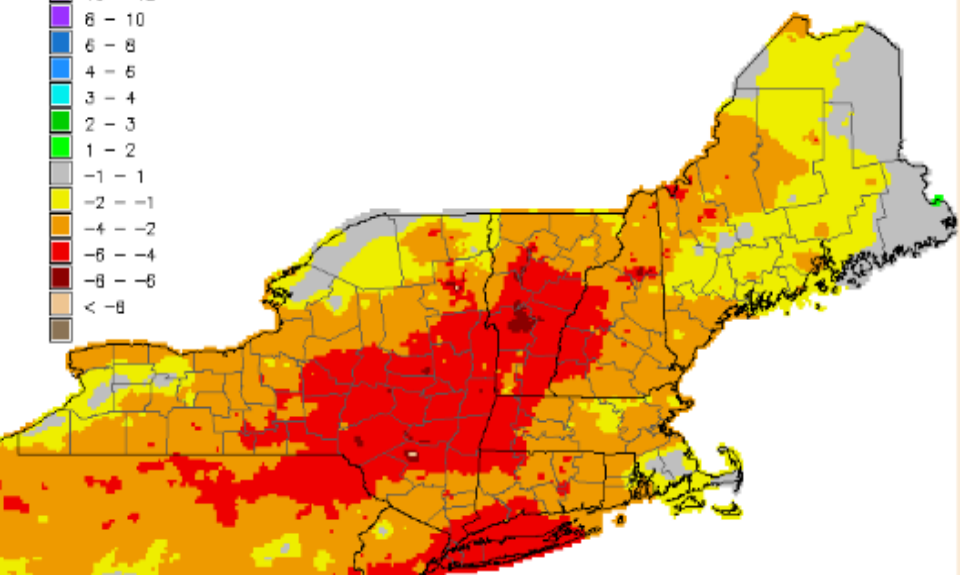


## Oceanic Niño Index (ONI)

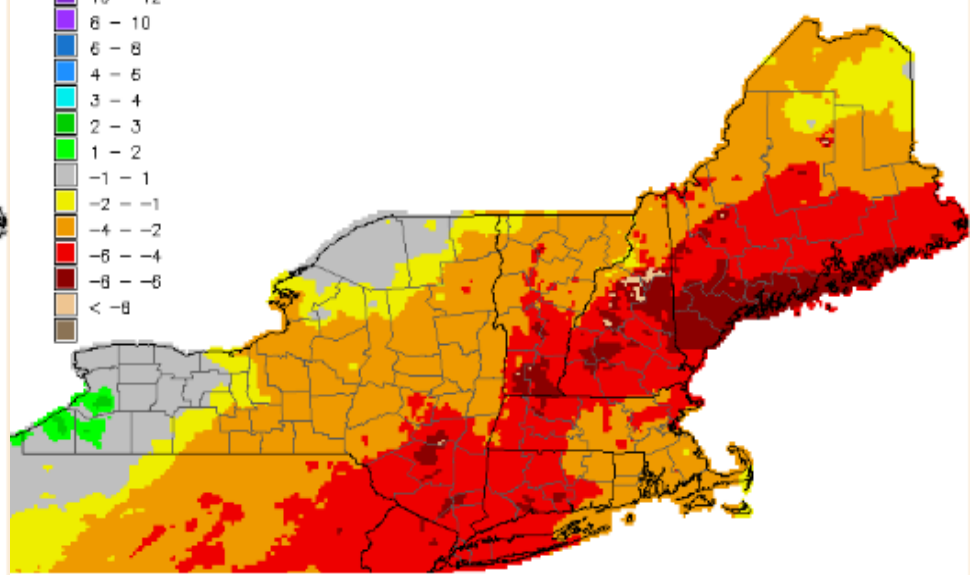
[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/ensostuff/ensoyear.s.shtml](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyear.s.shtml)



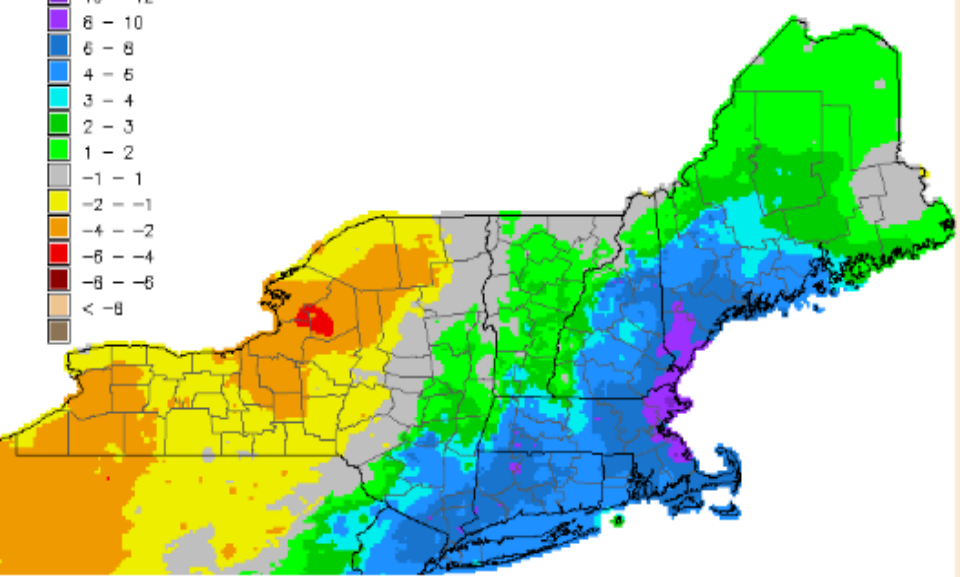
### Jul-Aug-Sep 1982 Difference



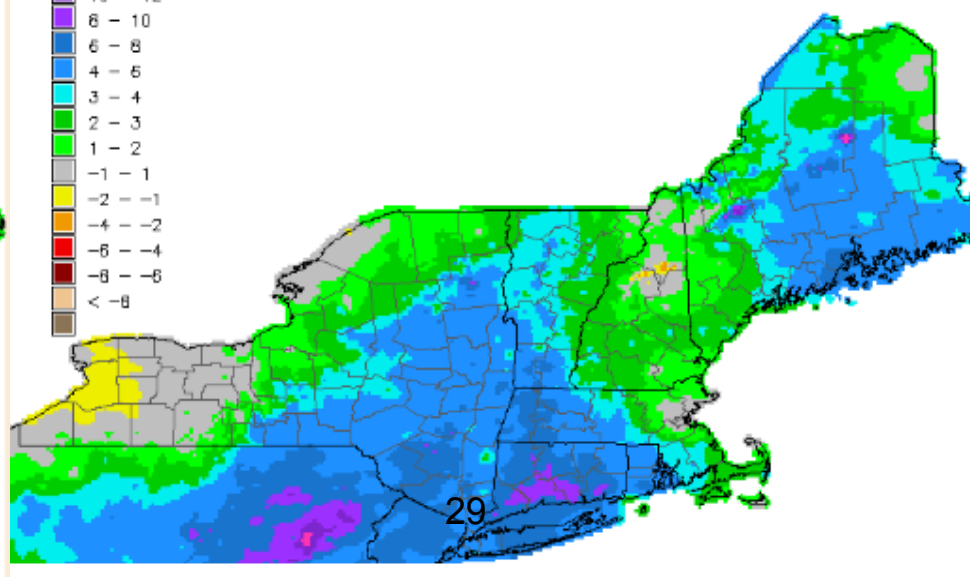
### Oct-Nov-Dec 1982 Difference



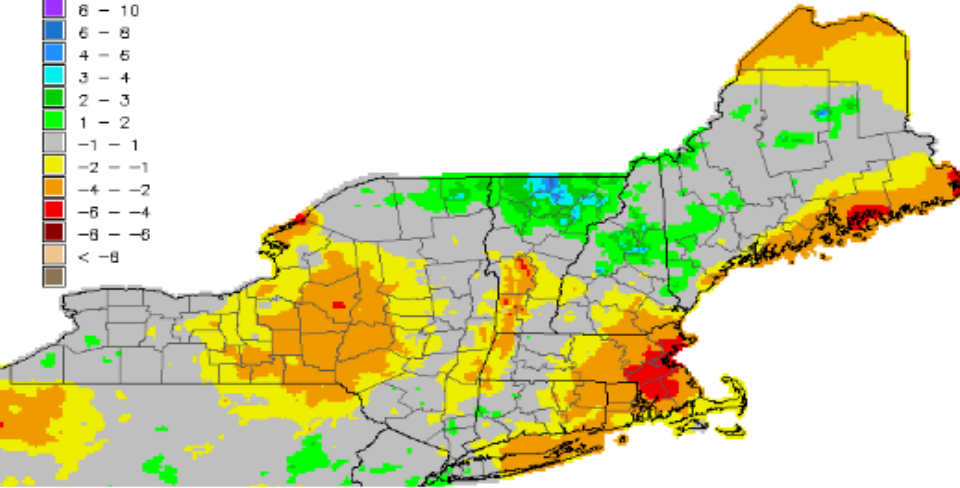
### Jan-Feb-Mar 1983 Difference



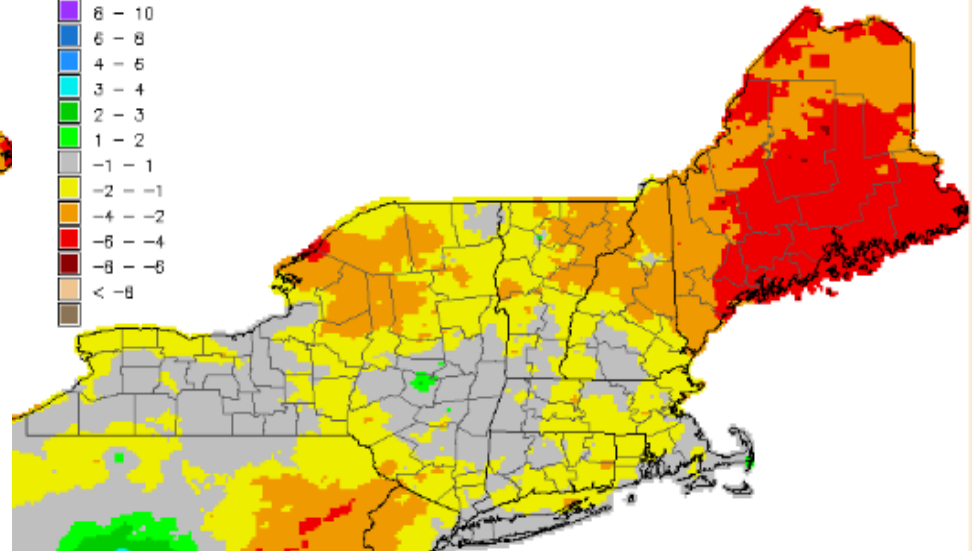
### Apr-May-Jun 1983 Difference



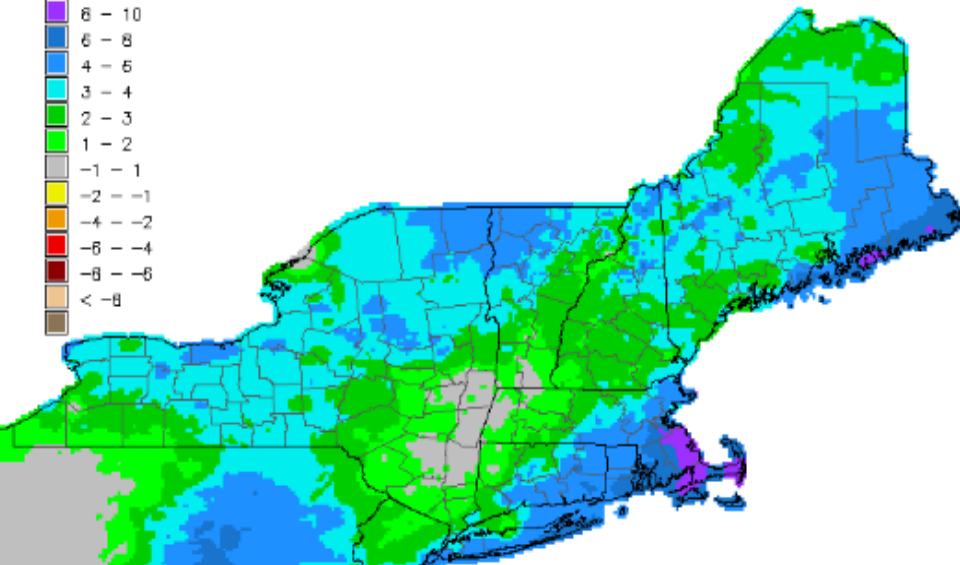
### Jul-Aug-Sep 1997 Difference



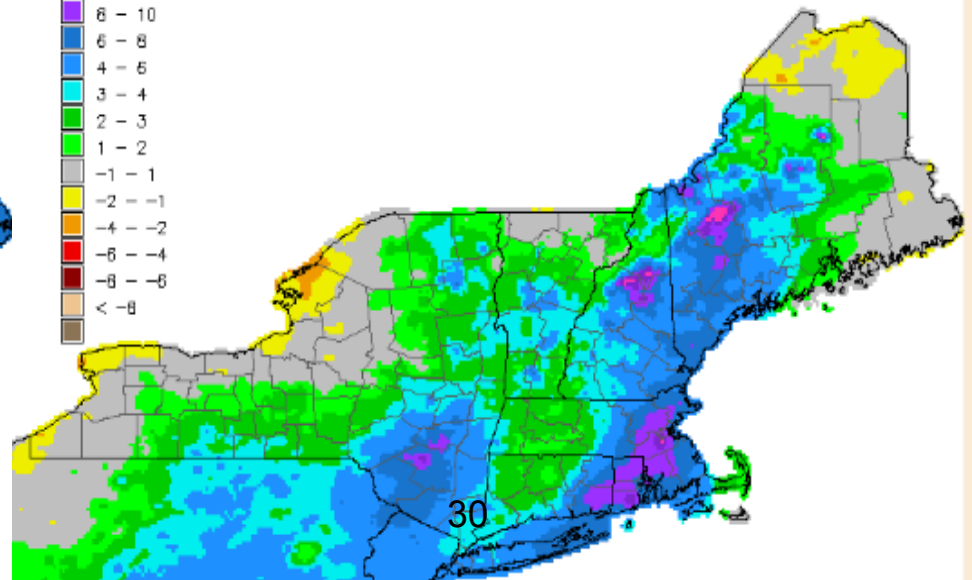
### Oct-Nov-Dec 1997 Difference



### Jan-Feb-Mar 1998 Difference



### Apr-May-Jun 1998 Difference



# Flood Potential



## ENSO events with ONI $\geq 1.7$

Basin	Flood Potential (all categories)	Most active flood season of major ENSOs
Great Lakes	Above	72-73
Hudson-Mohawk	Above	97-98
Champlain	Much above	97-98
Connecticut	Above	97-98
Southern New England	Much above	82-83 and 97-98
Merrimack	Above – lower Neutral – upper	97-98 72-73
Maine	West – Much Above East - Above	97-98 82-83

- **Notable events in the 1.5-1.7 range include 1986-87 and 2009-10**
- **Both 86-87 and 09-10 ENSO were “Modoki Events” – ie: central Pacific-based**
- **Both late winter/early spring experienced much above normal flooding**



# Open Discussion

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- Do you have an understanding of El Nino, it's origin and impacts?
- Do you know where to find information on El Nino, at national and regional scales?
- What additional information would you find beneficial for the current event?
- For the next event, what tools and resources would you like to see developed?



Thank you

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