



# El Niño & Expected Florida Severe Weather



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ONE BAY Resilient Communities  
Working Group Meeting  
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# El Niño & Expected Florida Severe Weather



Presentation  
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El Nino StoryMap

<https://goo.gl/ELtRrp>



# What is El Niño?



# What is El Niño?

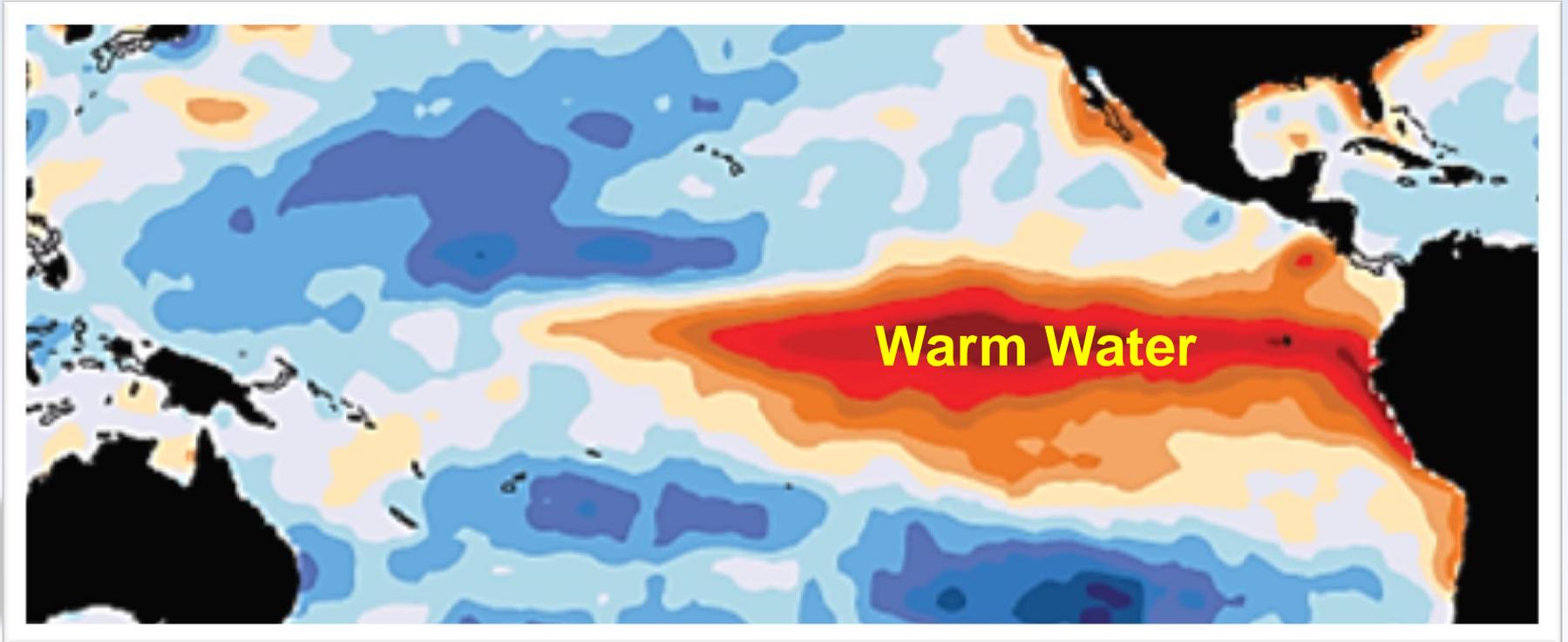
El Niño is Spanish for...

**“The Niño”**





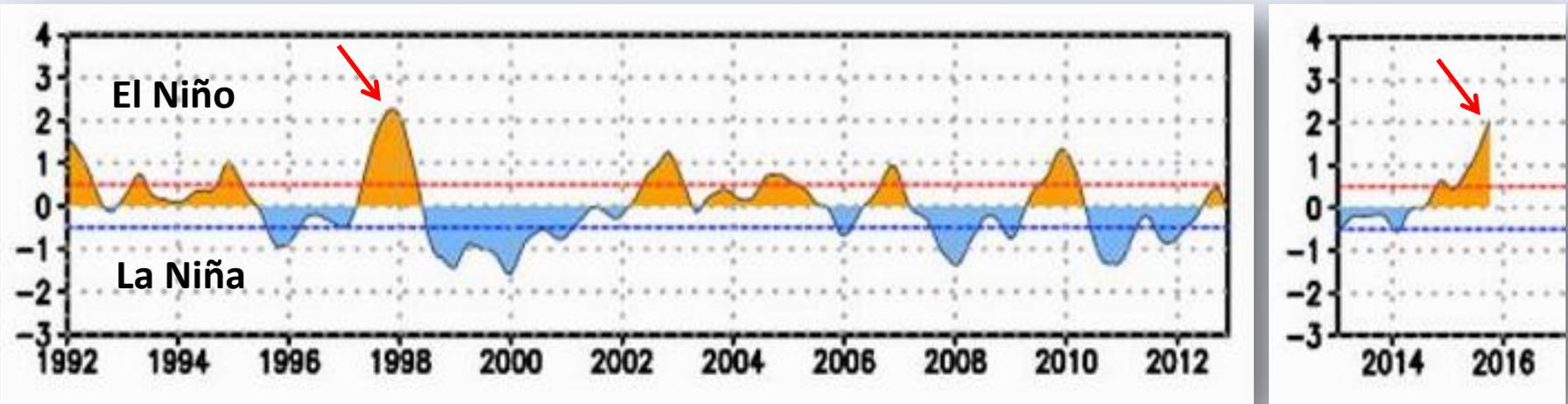
# What is El Niño?





# The Cycle of El Niño/La Niña

Water temperature departure from normal in degrees Celsius



- Natural Cycle
- El Niño typically strongest during the winter
- To be classified as an El Niño, the water temperature must be  $\geq +0.5$  degree departure from normal for 3 months



# Where Did El Niño Get It's Name?

- During the 1600s, South American fishermen noticed cycles of unusually warm, nutrient poor water, resulting in poor fishing
- El Niño means The Little Boy, or Christ Child in Spanish
  - chosen based on the time of year (around December) when the warm waters events occurred.





# How Water Temperature Influence Fishing

In normal conditions

During El Niño

depth  
in metres

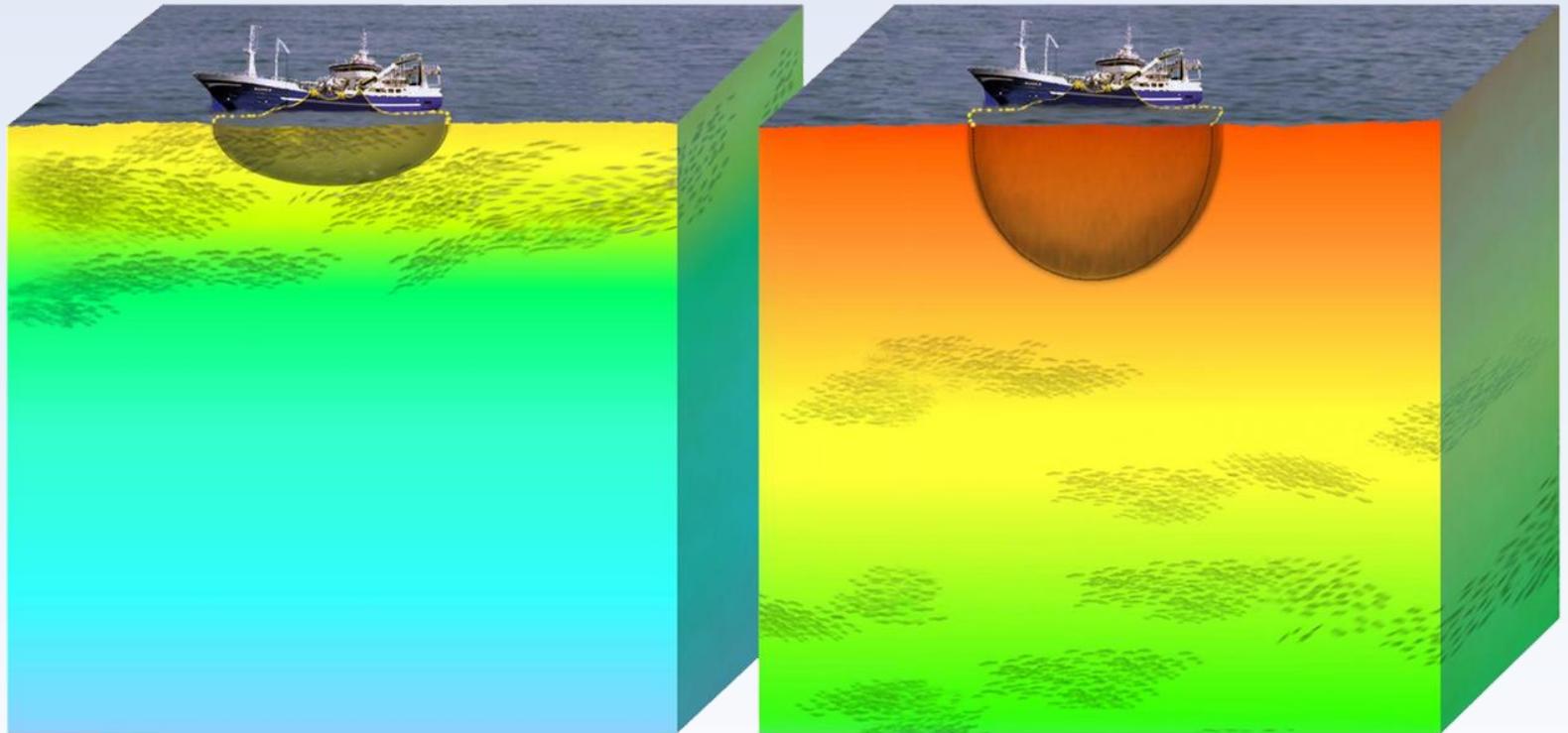
0

50

100

150

200



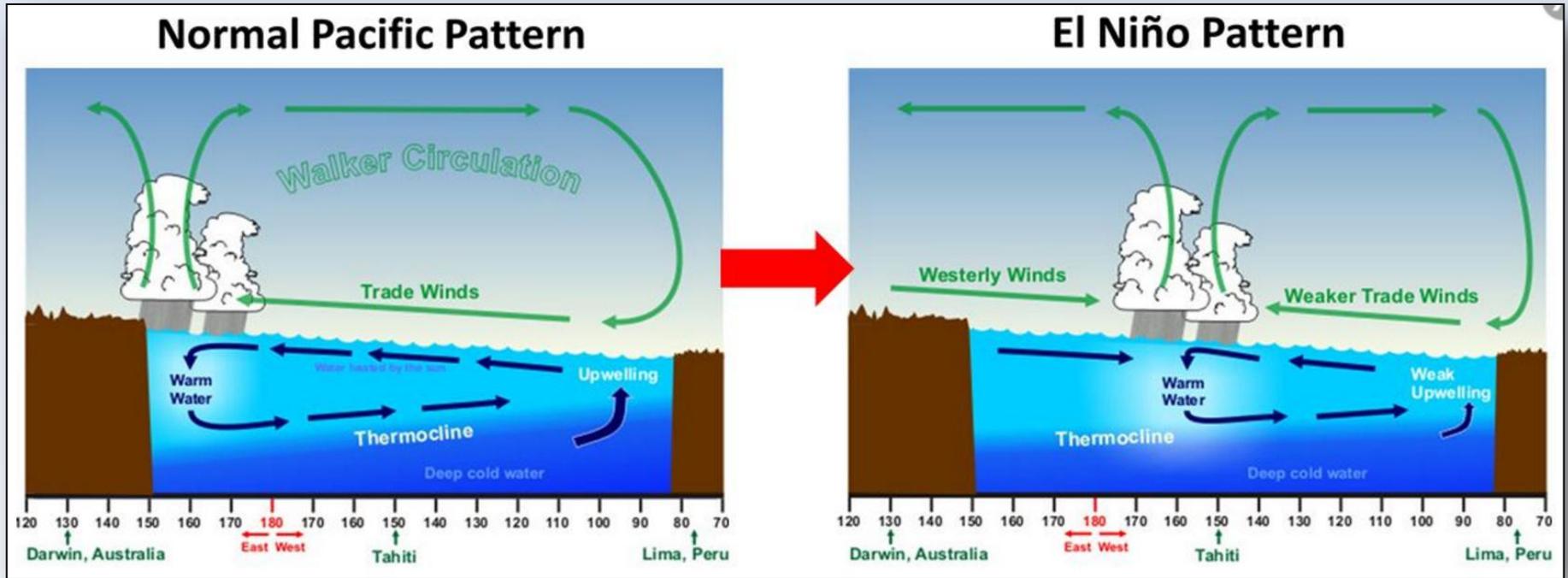
Water  
temperature in °C

0

30

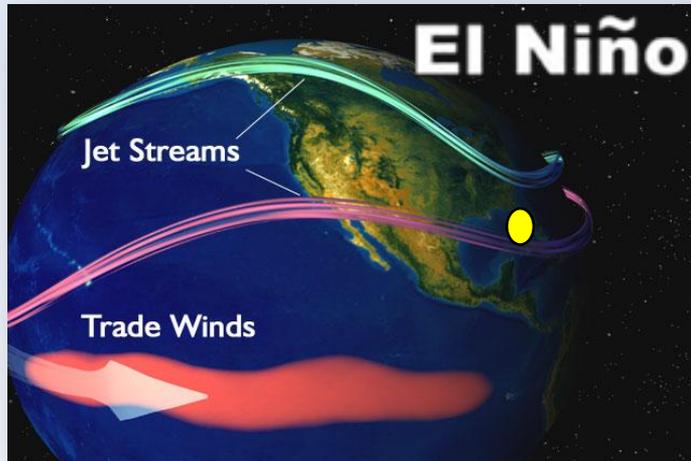


# El Niño Changes Location of Jet Stream

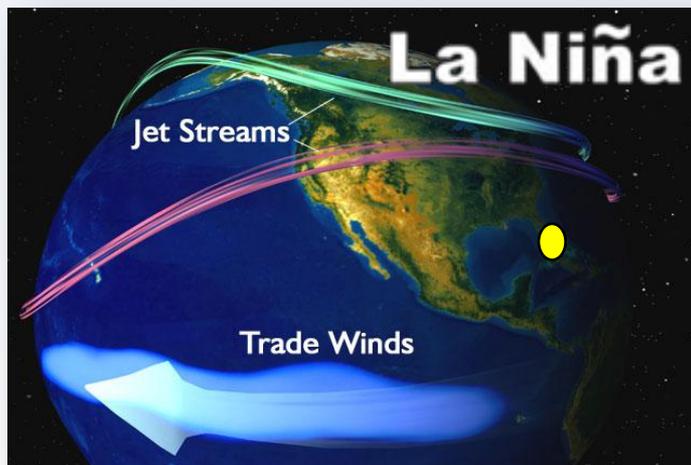




# El Niño vs La Niña Jet Stream Location

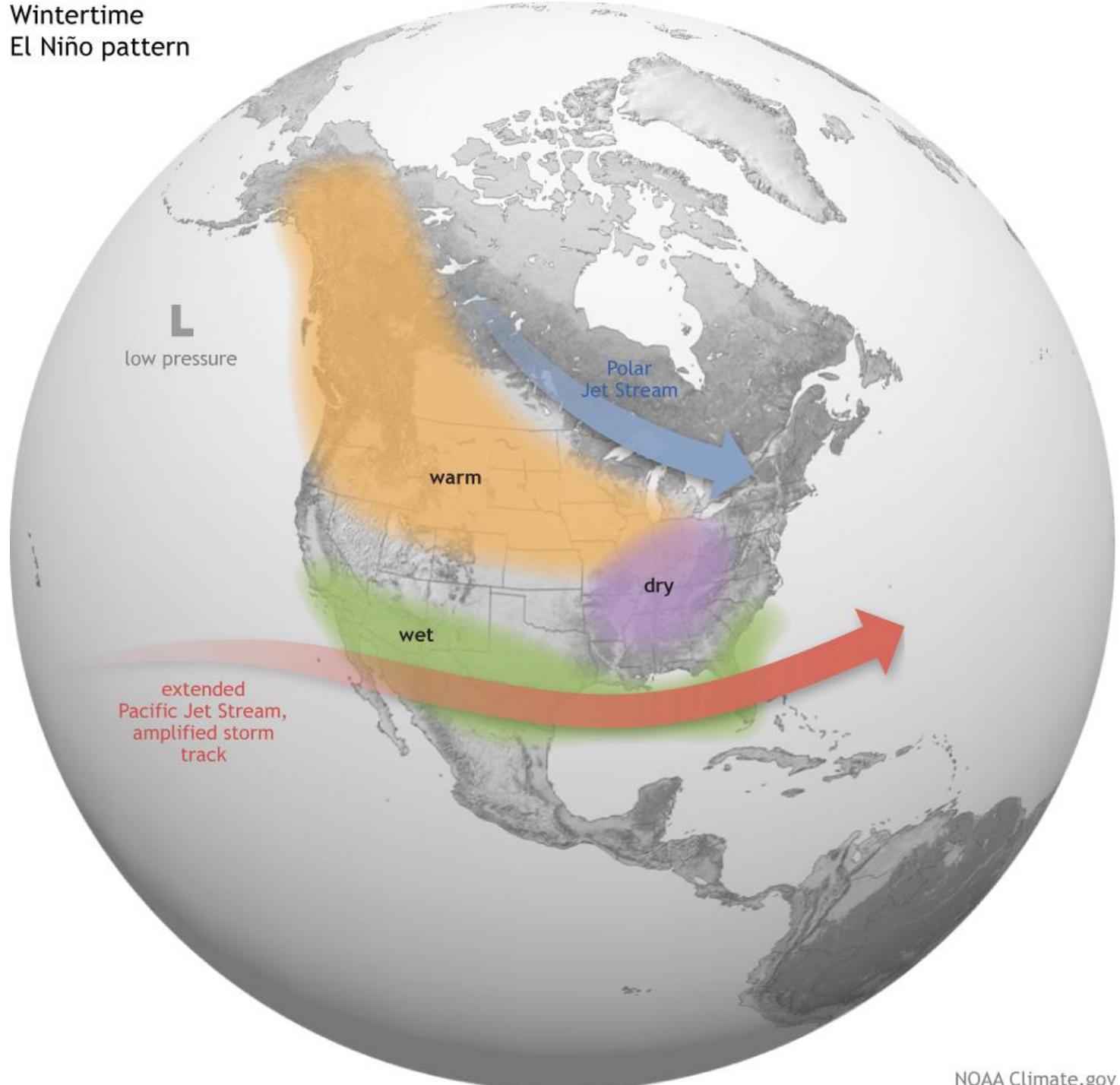


Jet stream over Florida with more active weather



Jet stream north of Florida with less active weather

Wintertime  
El Niño pattern

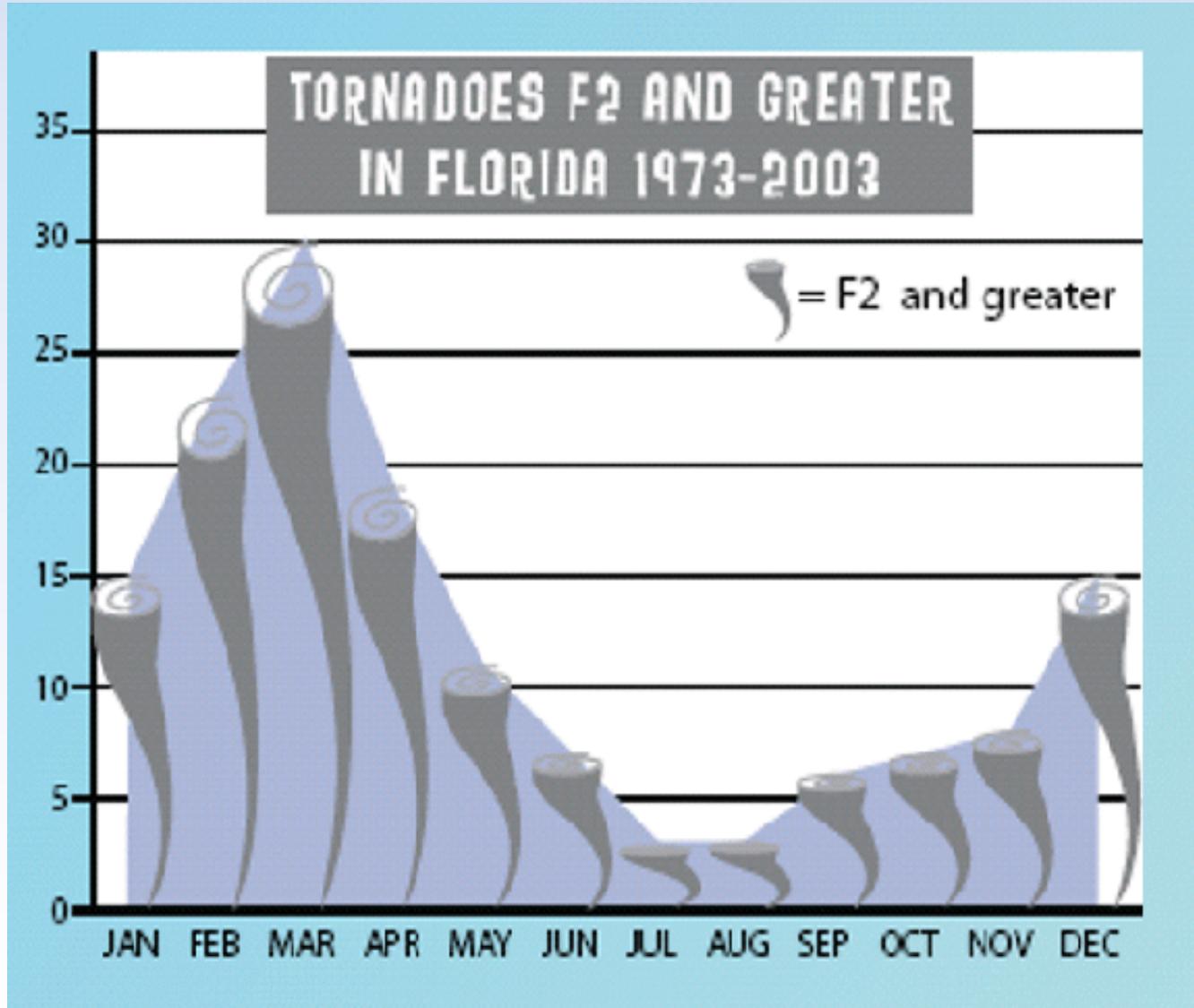


# Comparison of Winter Storm Tracks



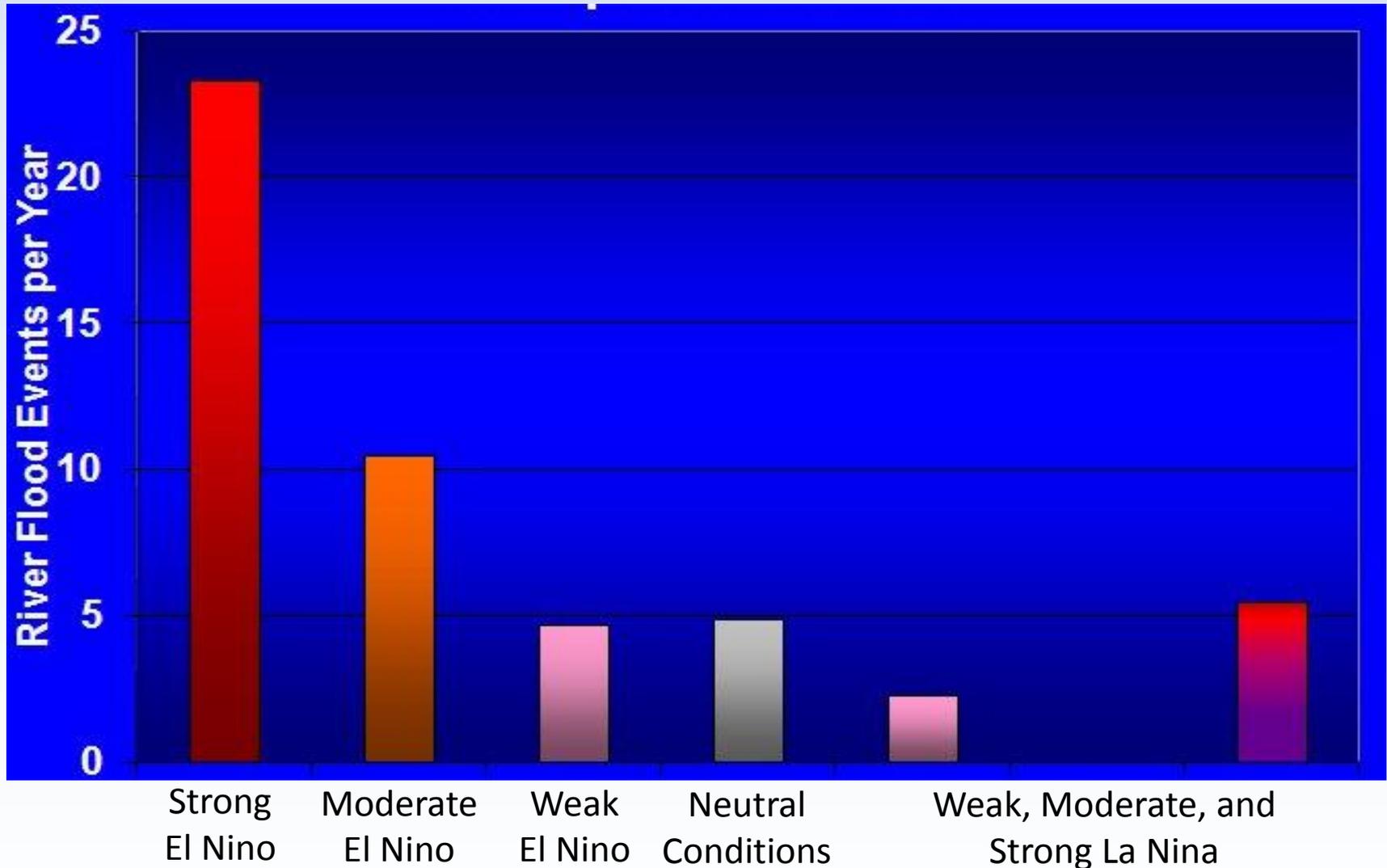


# Violent Tornadoes in Florida





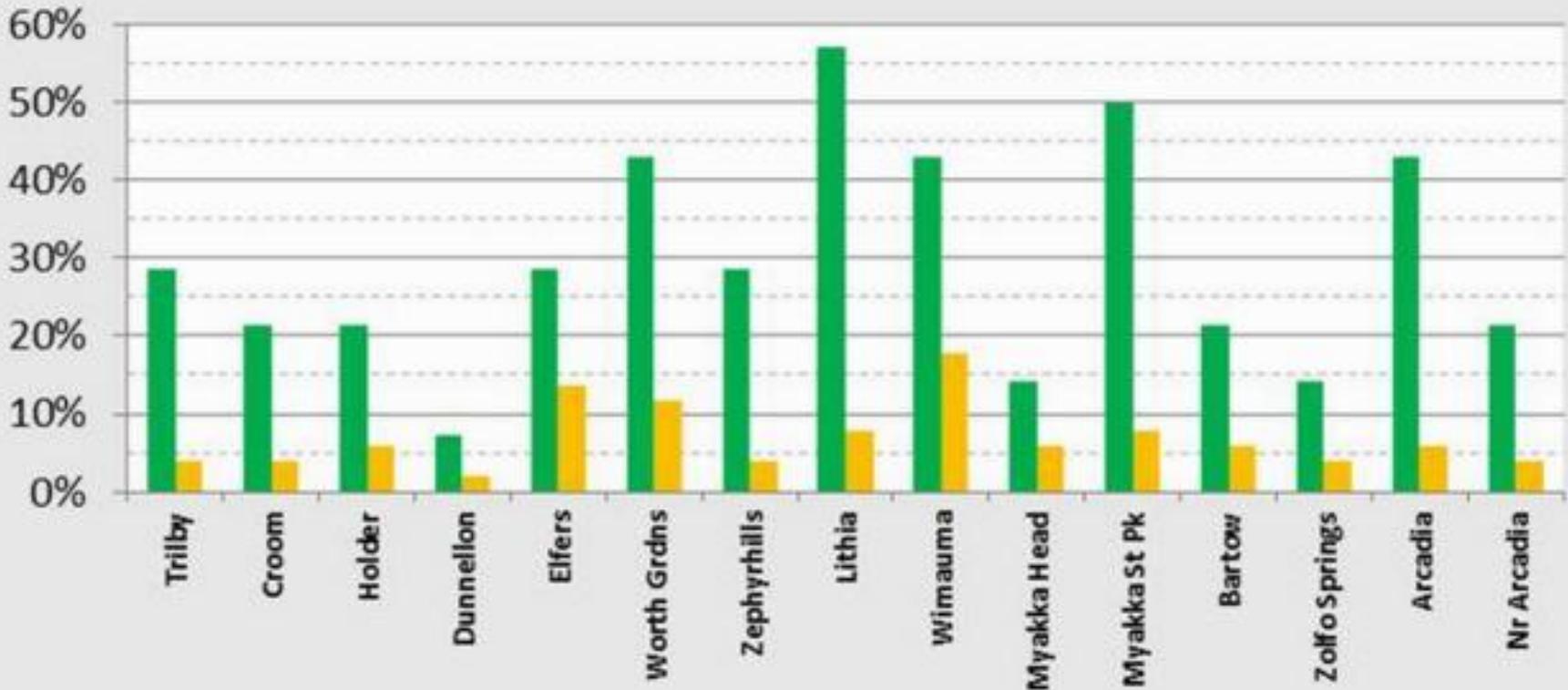
# Expected Florida River Flood Events per Year





# Probability of Flooding for Specific Locations

## Probability of River Flooding Dec 1 - Apr 30



\*Data 1950-2014

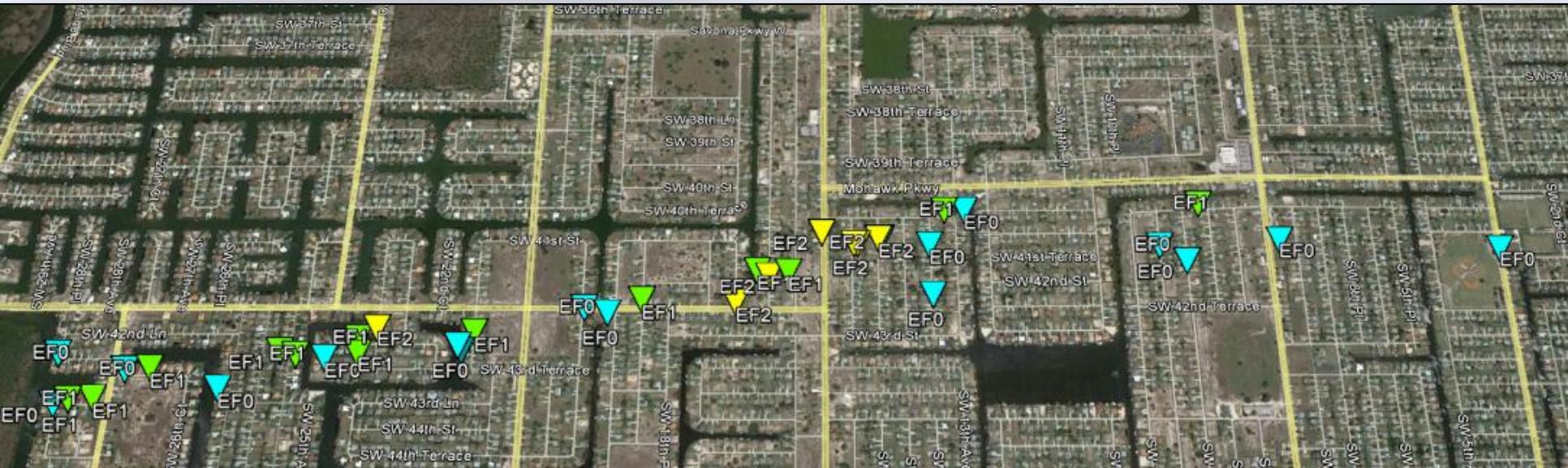
■ Strong El Niño Years    ■ All Other Years



# January 9, 2016 Cape Coral Tornado



- EF-2 Tornado (132 mph)
- Path 3.4 miles long
- 182 yards wide
- 3 injuries
- 178 structures damaged
- \$5.5 million in damage





# New Construction, Moved in 1 Month Ago





# January 15, 2016 Fort Myers Tornado Warning



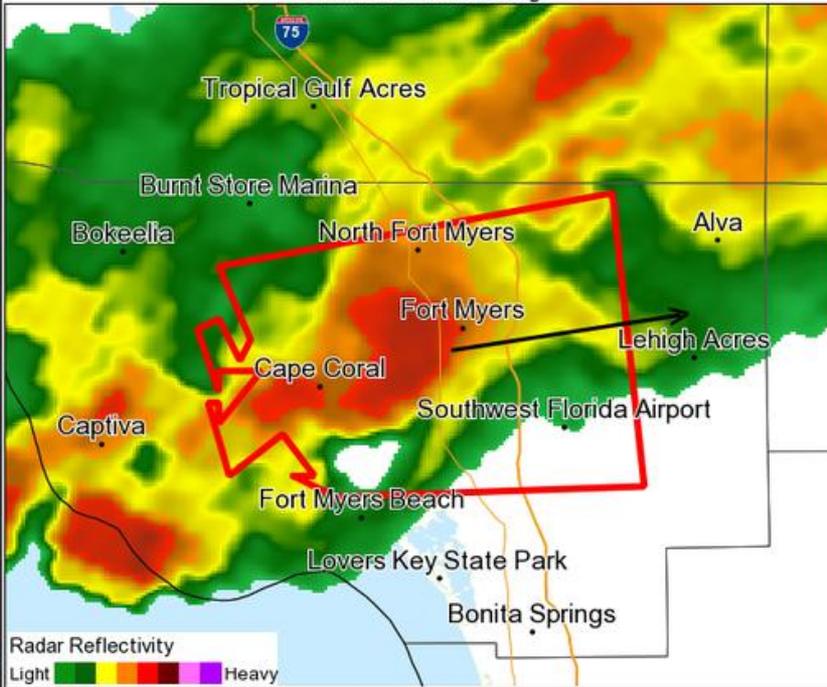
## Tornado Warning

Valid until January 9th, 2016 at 7:15 PM EST

@NWS Tampa Bay

Created Saturday January 9th, 2016 at 7:04 PM EST

7:01 PM EST Radar Image



Warning Area



### Impact Statistics

Population: 428,537  
Area: 395 square miles

Miles of interstate: 19  
Miles of railroad: 26

Public Schools: 99  
Hospitals: 6

Airports: 2  
National Parks: 0

### Storm Information

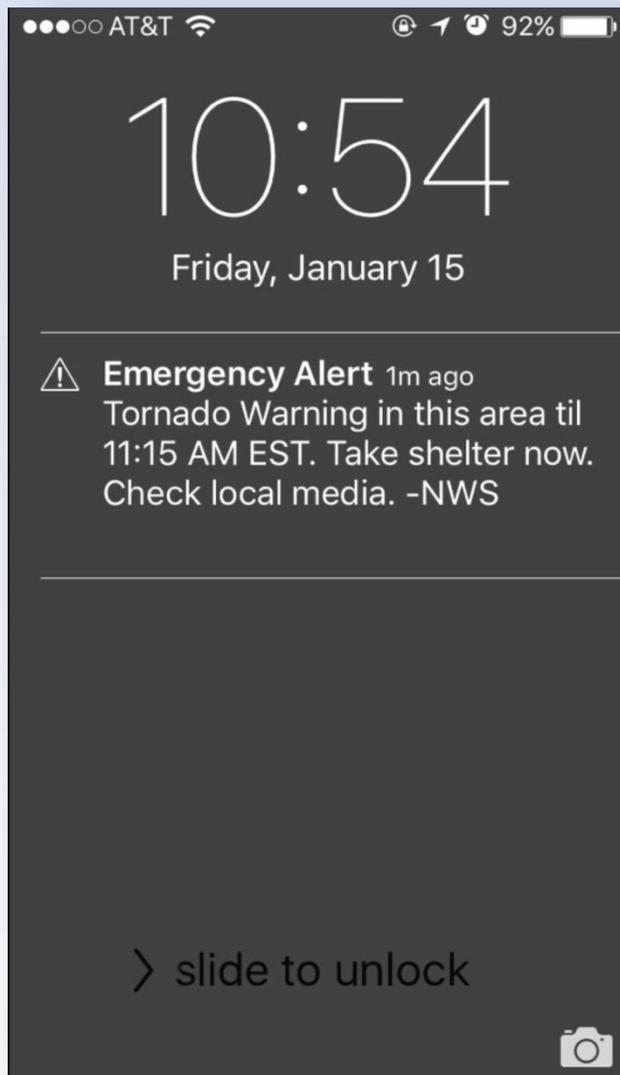
Moving to the East at 40 MPH

Hail up to .75 inches in diameter

Tornado Radar Indicated



# Wireless Emergency Alert



- FCC/FEMA Initiative
- Free
- Available since 2012
- Cell phones auto enrolled
- Limited to 90 characters
- All phones connected to a tower within the warning receive message at same time



# Wireless Emergency Alert

## NWS Alerts Limited to

Warning Type
Tsunami Warning
Tornado Warning
Extreme Wind Warning
Flash Flood Warning
Hurricane Warning
Typhoon Warning
Blizzard Warning
Ice Storm Warning
Lake Effect Snow Warning
Dust Storm Warning

## Some of the Other Alerts

- Presidential Alert
- Immediate Evacuation Warning
- Civil Emergency Message
- Law Enforcement Warning
- Shelter in Place Warning
- 911 Outage Emergency



# Jan 17, 2016 Sarasota F2 Tornado – 127 mph

2 injuries





# Jan 17, 2016 Duette F2 Tornado – 127 mph

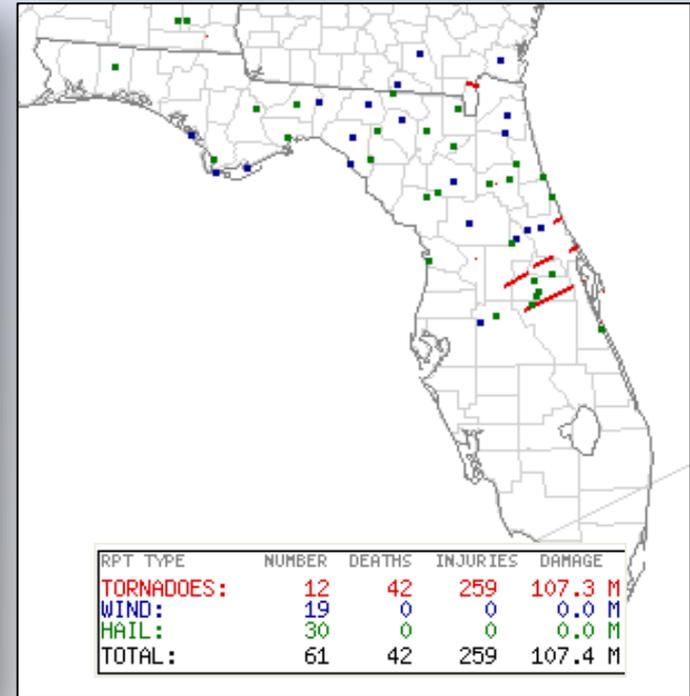
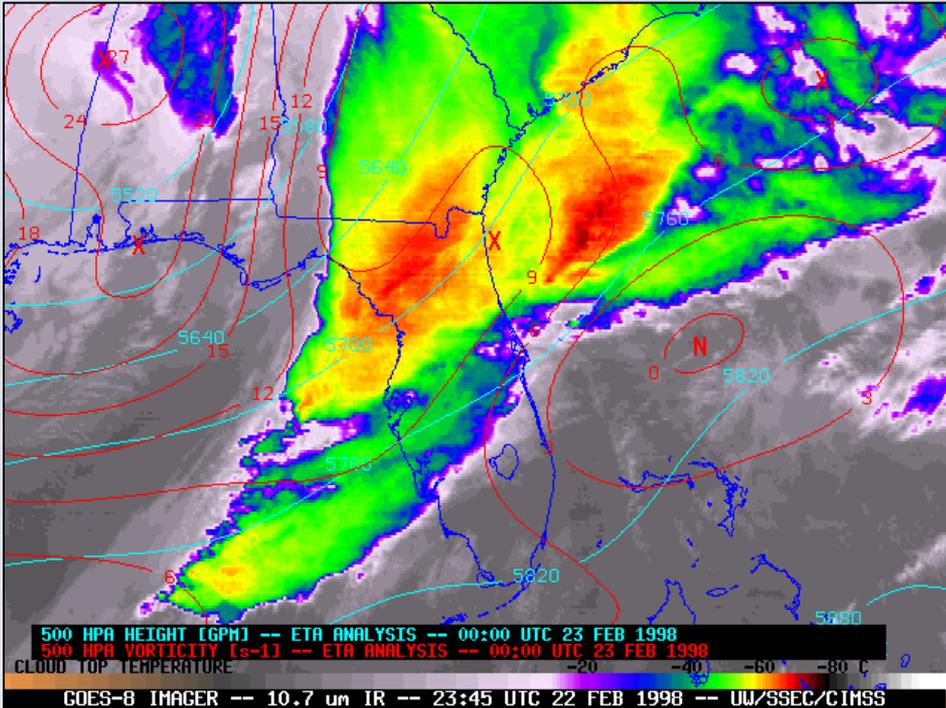
2 fatalities, 4 injuries





# Central Florida Tornado Outbreak

February 23, 1998



Tornadoes: 12

Deaths: 42, Injuries: 259, Damage: \$107.3 million



# El Niño Florida Impact Awareness

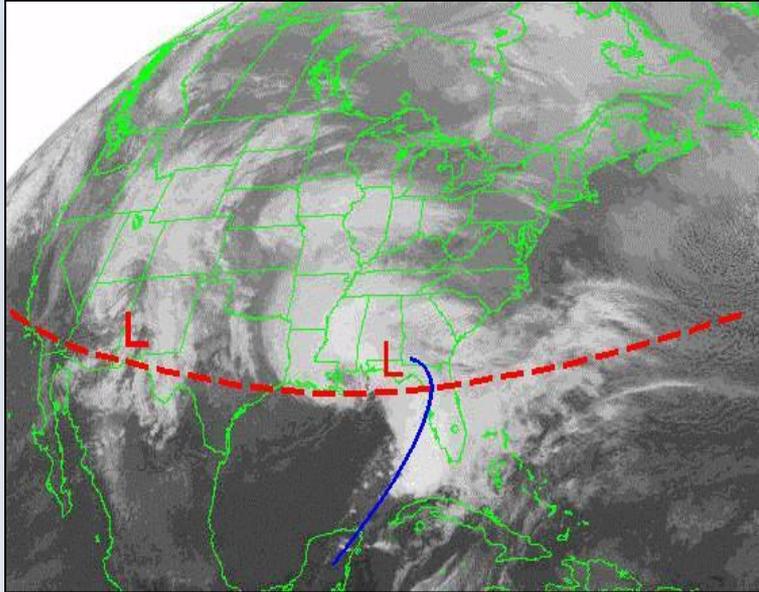
Potential for historic El Niño this winter and upcoming spring, even stronger than the 1997/98 El Niño

- increased chances for strong-to-violent tornadoes and tornado outbreaks
- increased chances for episodes of heavy rain and river flooding

Given that the previous eight winters in Florida experienced storminess much below normal, the likely transition to a very active season may come as a surprise to those who are unaware



# Increased Winter/Spring Severe Weather



- Florida's two deadliest tornado outbreaks
  - 2/22-23/98: 42 fatalities in Kissimmee
  - 2/02/2007: 21 fatalities in Lady Lake
- 1997-98 record rain and river flooding

## Key Points

- El Niño's don't cause violent tornadoes in Florida, but they enable them
- ✓ El Niño's SET THE STAGE!
- ✓ Environmental conditions become more favorable, more often

**February 22-23, 1998 11 p.m. – 3 a.m.  
Osceola / Orange / Seminole Counties  
42 fatalities (3 F3 Tornadoes)**



**February 2, 2007 1 a.m. – 3 a.m.**  
**Lake / Volusia Counties**  
**21 fatalities (2 EF3 Tornadoes)**





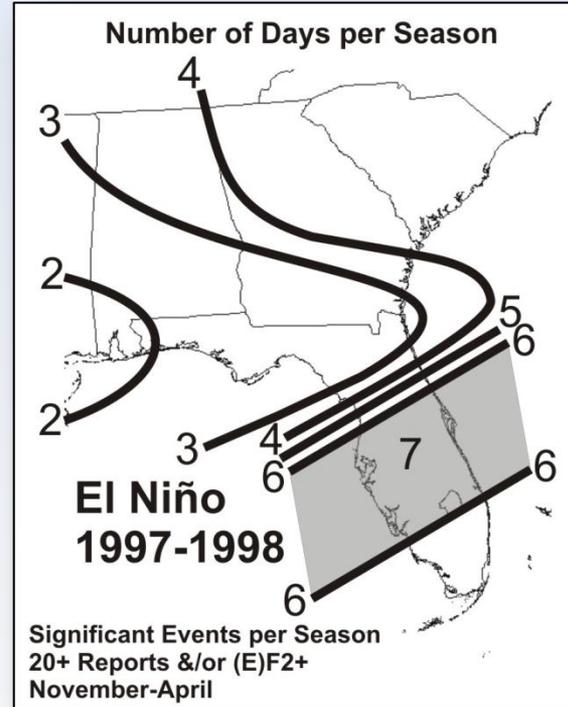
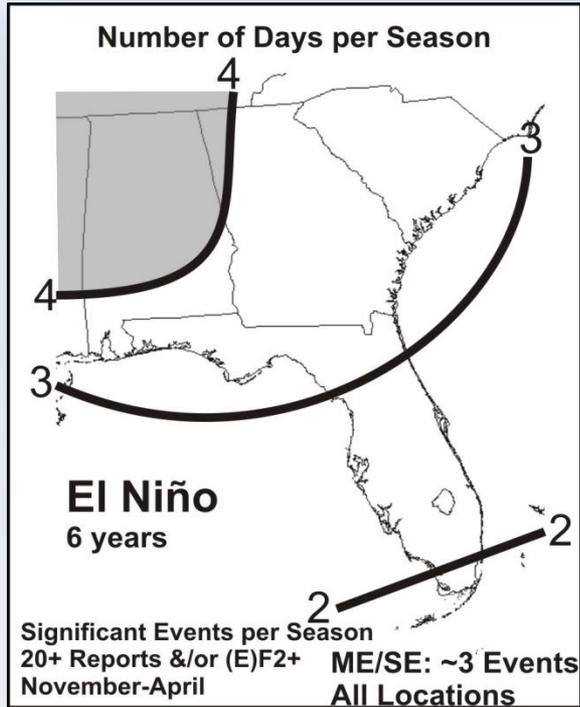
# La Niña vs. El Niño Tornadoes in Florida





# How Many Days of Violent Weather Can We Expect?

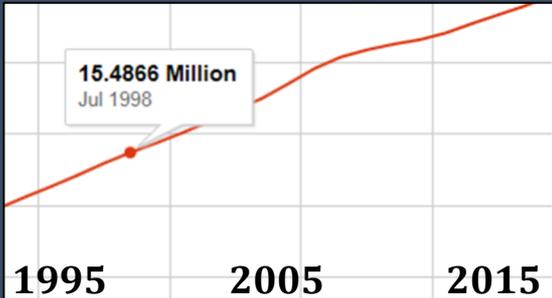
Pattern is most pronounced from January-April





# Florida Societal Considerations

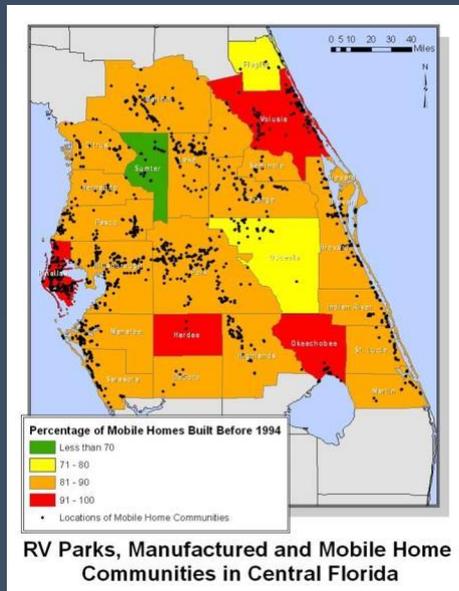
## Increasing Vulnerability



4.7 million new residents since 1998 outbreak!

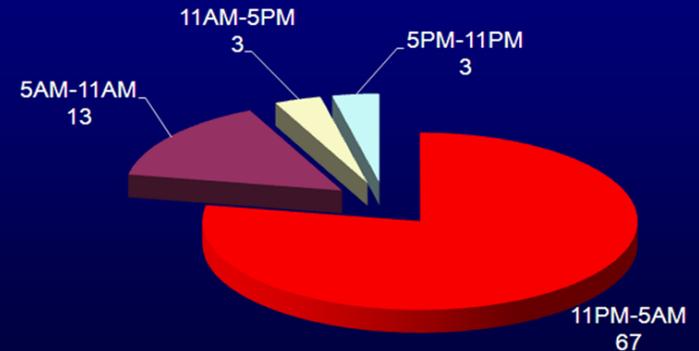
Many unaware of Florida (winter) severe weather risks

- High percentage of mobile homes
- Much lower threshold for damage
- High winter occupancy
- Greater casualty rate



## Time of Day

Most of The Tornado Deaths During El Nino Have Occurred Between 11PM and 5AM!



Hourly Distribution of 86 ≥F2 Tornado Deaths During 11 Strongest El Niño's Since 1950

## Overnight Tornadoes

- Lower perception of threat
- Decreased Awareness (asleep)
- Favored time period



# Some Tornadoes are Worse Than Others

Tornadoes 2008-2012 in Study Area (north central U.S.)

13% were EF2-EF5, 262 fatalities (97%)

87% were EF0-EF1, 7 fatalities (3%)

Local destruction shown below



Lady Lake Feb 2, 2007 – 21 killed, 76 injured



Kissimmee Feb 22-23, 1998 – 42 killed, 260 injured



# Impact Based Warnings (IBW)

We are going to ring the bell louder for the worst storms

Provide additional information within our warnings to allow all the various warning notification systems to ring the bell louder

Began October 1, 2015



# Tornado Warning EF0 or EF1

BULLETIN - EAS ACTIVATION REQUESTED  
TORNADO WARNING  
NATIONAL WEATHER SERVICE DES MOINES IA  
425 PM CDT WED JUN 12 2013

THE NATIONAL WEATHER SERVICE IN DES MOINES HAS ISSUED A

\* TORNADO WARNING FOR...  
SOUTHWESTERN BREMER COUNTY IN NORTHEAST IOWA...  
CENTRAL BUTLER COUNTY IN NORTH CENTRAL IOWA...

\* UNTIL 500 PM CDT

\* AT 422 PM CDT...A SEVERE THUNDERSTORM CAPABLE OF PRODUCING A  
TORNADO WAS LOCATED NEAR ALLISON...AND MOVING EAST AT 20 MPH.

HAZARD...TORNADO AND QUARTER SIZE HAIL.

SOURCE...RADAR INDICATED ROTATION.

IMPACT...FLYING DEBRIS WILL BE DANGEROUS TO THOSE CAUGHT  
WITHOUT SHELTER. MOBILE HOMES WILL BE DAMAGED OR  
DESTROYED. DAMAGE TO ROOFS...WINDOWS AND VEHICLES  
WILL OCCUR. TREE DAMAGE IS LIKELY.

\* LOCATIONS IMPACTED INCLUDE...  
CLARKSVILLE...SHELL ROCK...WAVERLY AND PLAINFIELD.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

TAKE COVER NOW. MOVE TO AN INTERIOR ROOM ON THE LOWEST FLOOR OF  
A STURDY BUILDING. AVOID WINDOWS. IF IN A MOBILE HOME...A VEHICLE  
OR OUTDOORS...MOVE TO THE CLOSEST SUBSTANTIAL SHELTER AND PROTECT  
YOURSELF FROM FLYING DEBRIS.

&&

LAT...LON 4284 9240 4264 9250 4265 9255 4275 9288  
4289 9282

TIME...MOT...LOC 2125Z 280DEG 17KT 4279 9278

TORNADO...RADAR INDICATED  
HAIL...1.00IN

SS



# Tornado Warning EF2 or Stronger



BULLETIN - EAS ACTIVATION REQUESTED  
TORNADO WARNING  
NATIONAL WEATHER SERVICE DULUTH MN  
657 PM CDT THU AUG 29 2013

THE NATIONAL WEATHER SERVICE IN DULUTH MN HAS ISSUED A

\* TORNADO WARNING FOR...  
NORTHWESTERN AITKIN COUNTY IN EAST CENTRAL MINNESOTA...  
EXTREME EAST CENTRAL CASS COUNTY IN NORTH CENTRAL MINNESOTA...

\* UNTIL 730 PM CDT

\* AT 656 PM CDT...A CONFIRMED LARGE AND EXTREMELY DANGEROUS  
TORNADO WAS LOCATED 4 MILES WEST OF HILL CITY...NEAR HIGHWAY  
200...AND MOVING SOUTHEAST AT 25 MPH.

THIS IS A PARTICULARLY DANGEROUS SITUATION.

HAZARD...DAMAGING TORNADO.

SOURCE...CONFIRMED TORNADO FROM TRAINED SPOTTERS.

IMPACT...YOU ARE IN A LIFE THREATENING SITUATION. FLYING  
DEBRIS MAY BE DEADLY TO THOSE CAUGHT WITHOUT SHELTER.  
MOBILE HOMES WILL BE DESTROYED. CONSIDERABLE DAMAGE  
TO HOMES...BUSINESSES AND VEHICLES IS LIKELY AND  
COMPLETE DESTRUCTION IS POSSIBLE.

\* LOCATIONS IMPACTED INCLUDE...  
HILL CITY...SWATARA...HAYPOINT AND BAIN.  
HIGHWAY 200 WEST OF HILL CITY.  
HIGHWAY 169 SOUTH OF HILL CITY.  
QUADNA MOUNTAIN RESORT AREA.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

TO REPEAT...A LARGE...EXTREMELY DANGEROUS AND POTENTIALLY DEADLY  
TORNADO IS ON THE GROUND. TO PROTECT YOUR LIFE...TAKE COVER NOW.  
MOVE TO AN INTERIOR ROOM ON THE LOWEST FLOOR OF A STURDY BUILDING.  
AVOID WINDOWS. IF IN A MOBILE HOME...A VEHICLE OR OUTDOORS...MOVE  
TO THE CLOSEST SUBSTANTIAL SHELTER AND PROTECT YOURSELF FROM FLYING  
DEBRIS.

THIS STORM HAS A HISTORY OF PRODUCING TORNADOES. TAKE COVER IN A  
BASEMENT OR STORM SHELTER NOW!

&&

LAT...LON 4703 9377 4703 9359 4694 9335 4684 9342  
4677 9361 4696 9386  
TIME...MOT...LOC 2356Z 310DEG 22KT 4698 9370

TORNADO...OBSERVED  
TORNADO DAMAGE THREAT...CONSIDERABLE  
HAIL...1.75IN

\$\$



# Public Awareness and Safety



- Monitor local television and radio for severe weather situations
- Have multiple ways to receive timely weather warnings
  - ✓ NOAA Weather radio
  - ✓ Wireless Emergency Alert
  - ✓ Reverse 911
  - ✓ Smartphone App



# Free FEMA App

<http://www.fema.gov/mobile-app>

The image shows a smartphone displaying the FEMA mobile app interface. The app has a blue header with the FEMA logo and the text "FEMA". Below the header, there are several menu items, each with a colored background and a plus sign or arrow icon:

- Prepare** (green background): "Disaster safety tips | Build a kit & ..."
- Weather Alerts** (red background): "Weather alerts from local officials"
- Disaster Resources** (dark blue background): "Apply for Assistance | Shelters & ..."
- Disaster Reporter** (light blue background): "Share GPS photos from a disaster..."
- Social Hub** (light gray background): "On m.fema.gov"
- Blog** (light gray background): "14 days ago"

Callouts with icons point to specific features of the app:

- Green checkmark icon:** Get tips to survive natural disasters, customize your emergency checklist, and save meeting locations
- Red lightning bolt icon:** Receive alerts from the National Weather Service
- Blue plus sign icon:** Locate open shelters and Disaster Recovery Centers, and apply for assistance
- Blue camera icon:** Upload and share your disaster photos
- Blue speech bubble icon:** Stay connected on social media and the FEMA blog



# What Can You Do?



Pick an employee who is into weather to be an Ambassador for a Weather Ready Nation

<http://weather.gov/tampa/?n=wrn>

The Ambassador will receive 1 or 2 Emails a month with resources to promote hazardous weather awareness and preparedness to those in your organization and can be a resource for your social media posts.



# A Few of our Local Ambassadors

- Pinellas County Sheriff
- Port Tampa Bay
- Saint Pete Astronomy Club
- University of South Florida
- Valencia Lakes Home Owners Association
- WUSF Public Radio
- WRMD Telemundo Tampa
- Fox 13 WTVT-TV Tampa Bay



# NWS Tampa Bay Social Media



<http://weather.gov/tampabay>



@NWSTampaBay



NWSTampaBay



NWSTampa

# Pinellas County El Niño Web Page

<http://www.pinellascounty.org/emergency/El-Nino.htm>

Pinellas County, Florida - E X

www.pinellascounty.org/emergency/El-Nino.htm

Apps NT Miami-Dade Sea Lev... FloridaPAPERS Millenials

Print | Subscribe | A A Text

Pinellas County FLORIDA

Emergency Management

Official Government Website

Contact Us | Calendar | **How Do I?** | News | Media | **SHARE** | February 05, 2016

Emergency Mgmt. Home

Hurricane Information

For Emergencies Only

Other Hazards

Resources

**Be Prepared**

SURVIVING THE STORM... IT'S EVERYONE'S RESPONSIBILITY

**EL NIÑO**  
Weather Event

**El Niño Severe Winter Weather**

With a strong El Niño weather pattern this year, the National Weather Service predicts an increased chance of severe weather in Florida over the winter with the threat of powerful thunderstorms, flooding, cold temperatures and tornadoes.

**Speaker's Bureau:**  
[El Niño Presentation](#)  
[Now Available](#)

**What is El Niño?**

The name El Niño was originally given by fishermen off the west coast of South America to the warm current that appeared every year around Christmas. It is Spanish for "The Child" and — is the name climate scientists use for the occasional periods of warming in the Pacific Ocean that create havoc for global weather patterns. El Niño is known to intensify winter storms across the

All-HazardsGuide  
Official Guide for  
Pinellas County

HurricaneVideos  
Variety of Hurricane  
Educational Videos

StayConnected  
Subscribe to E-lert, cell  
phone alerts, speakers

Twitter YouTube

