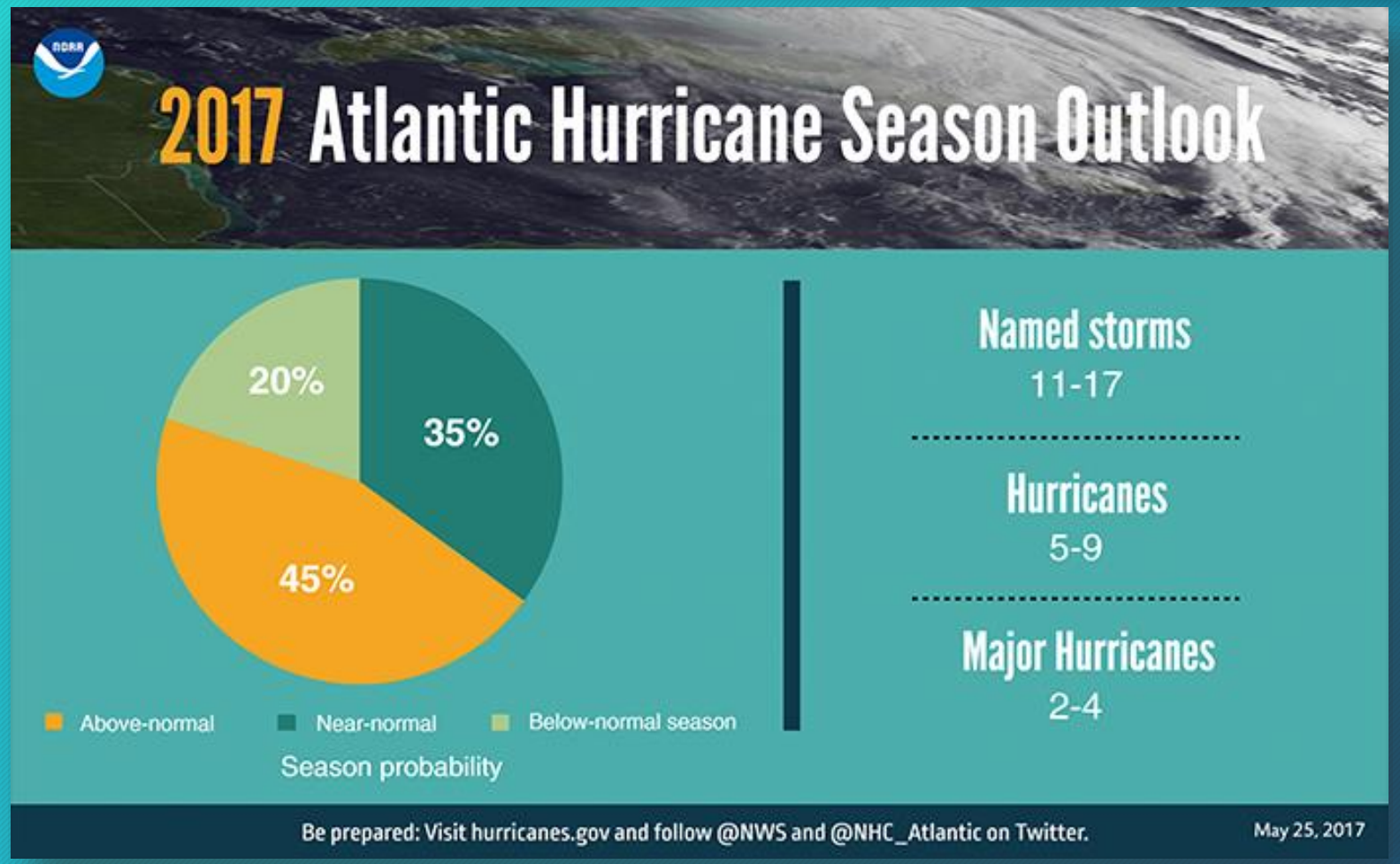
Hurricane Season 2017

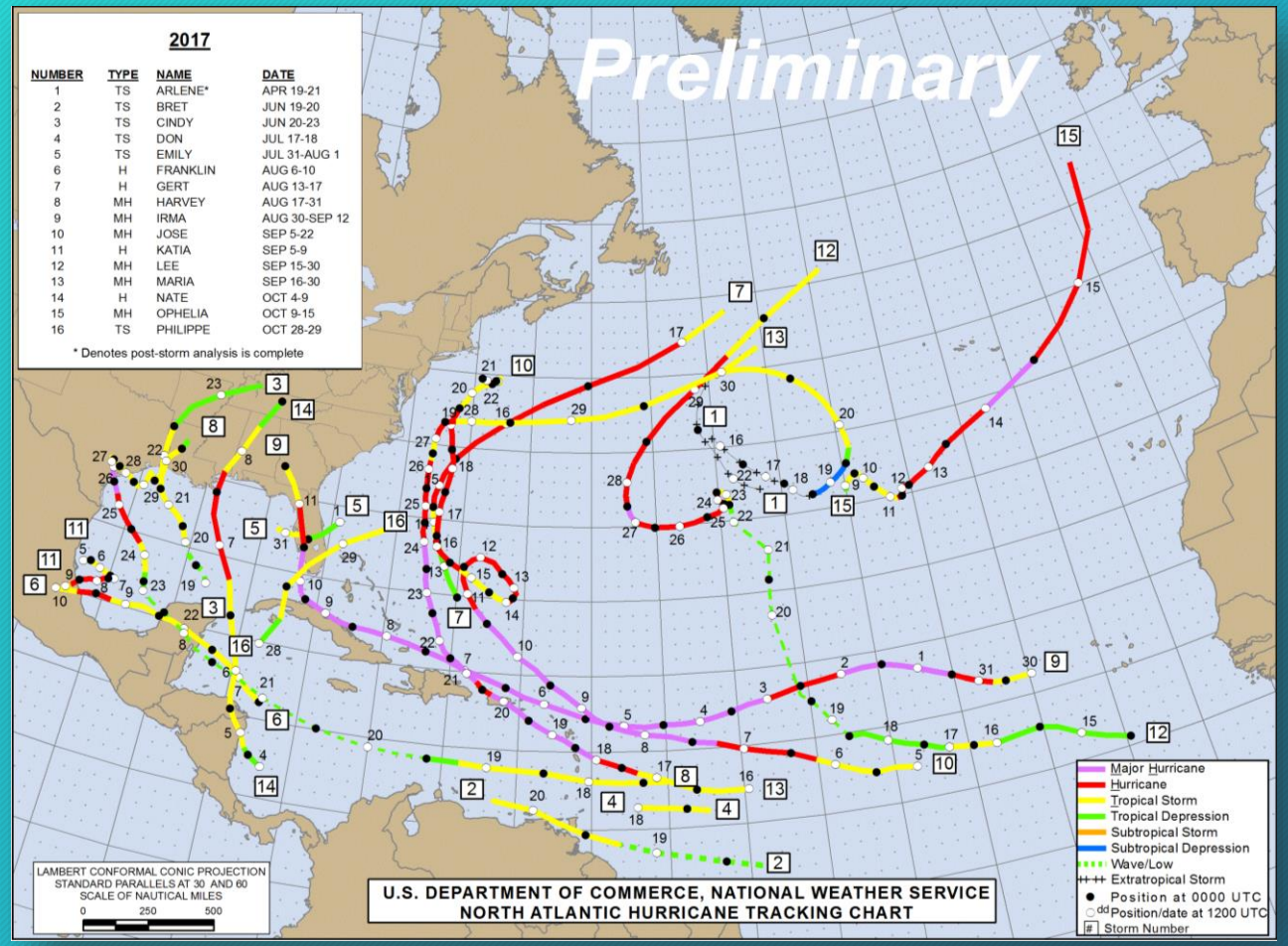
November 28, 2017
PHWAG
End-of-Season Meeting

Early Forecast – Above Average Season



- Neutral to weak La Nina conditions present.
- Favored higher confidence in above normal activity.

2017 Summary

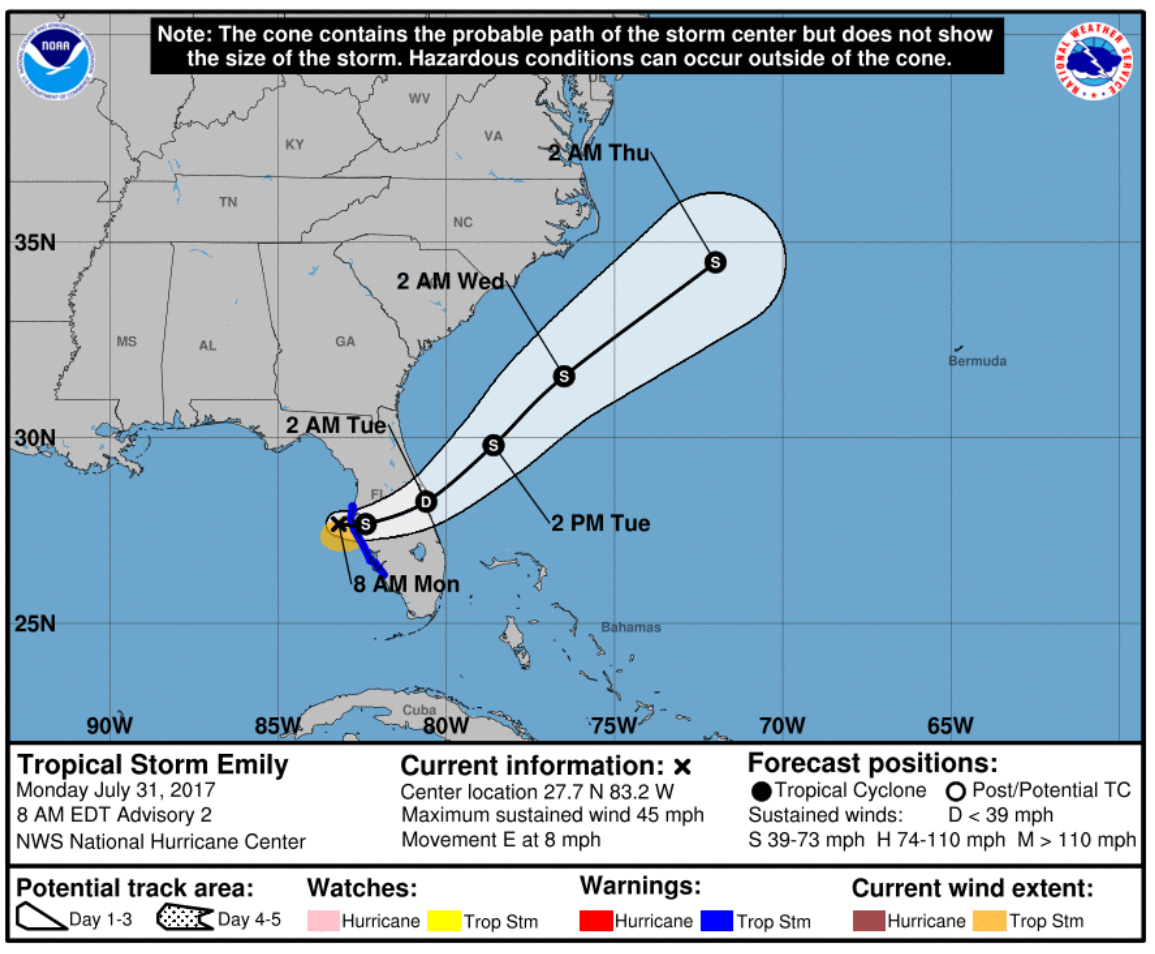


2017

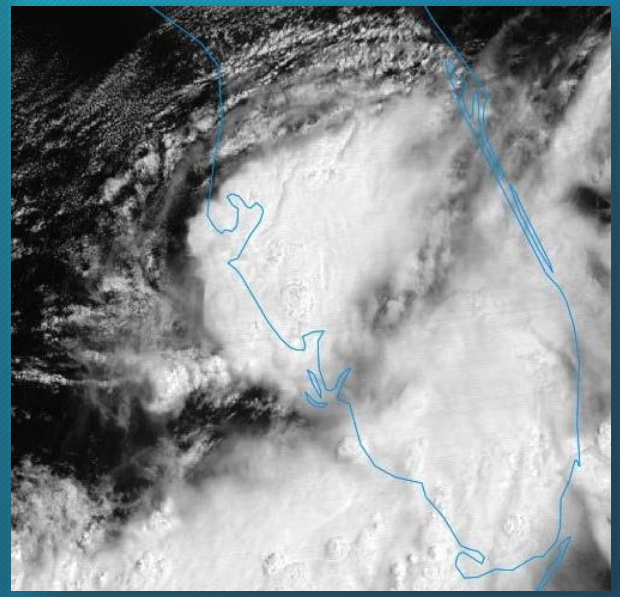
NUMBER	TYPE	NAME	DATE
1	TS	ARLENE*	APR 19-21
2	TS	BRET	JUN 19-20
3	TS	CINDY	JUN 20-23
4	TS	DON	JUL 17-18
5	TS	EMILY	JUL 31-AUG 1
6	H	FRANKLIN	AUG 6-10
7	H	GERT	AUG 13-17
8	MH	HARVEY	AUG 17-31
9	MH	IRMA	AUG 30-SEP 12
10	MH	JOSE	SEP 5-22
11	H	KATIA	SEP 5-9
12	MH	LEE	SEP 15-30
13	MH	MARIA	SEP 16-30
14	H	NATE	OCT 4-9
15	MH	OPHELIA	OCT 9-15
16	TS	PHILIPPE	OCT 28-29

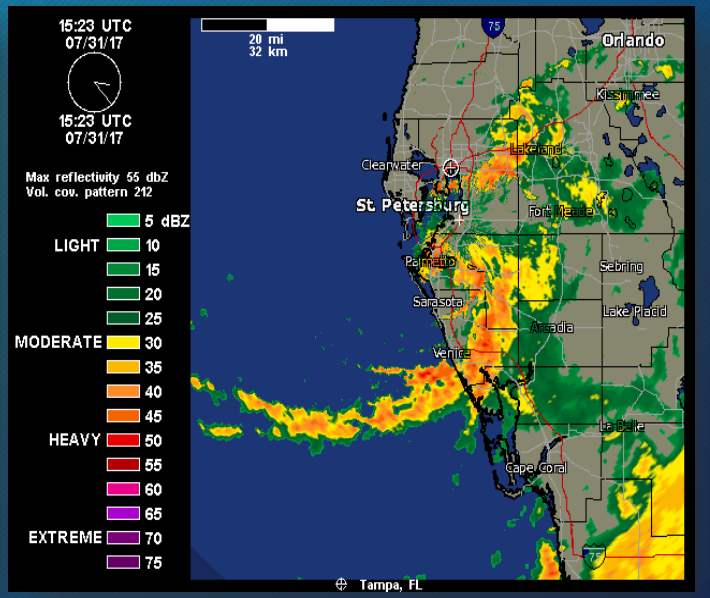
* Denotes post-storm analysis is complete

EMILY – The One-and-Done Storm

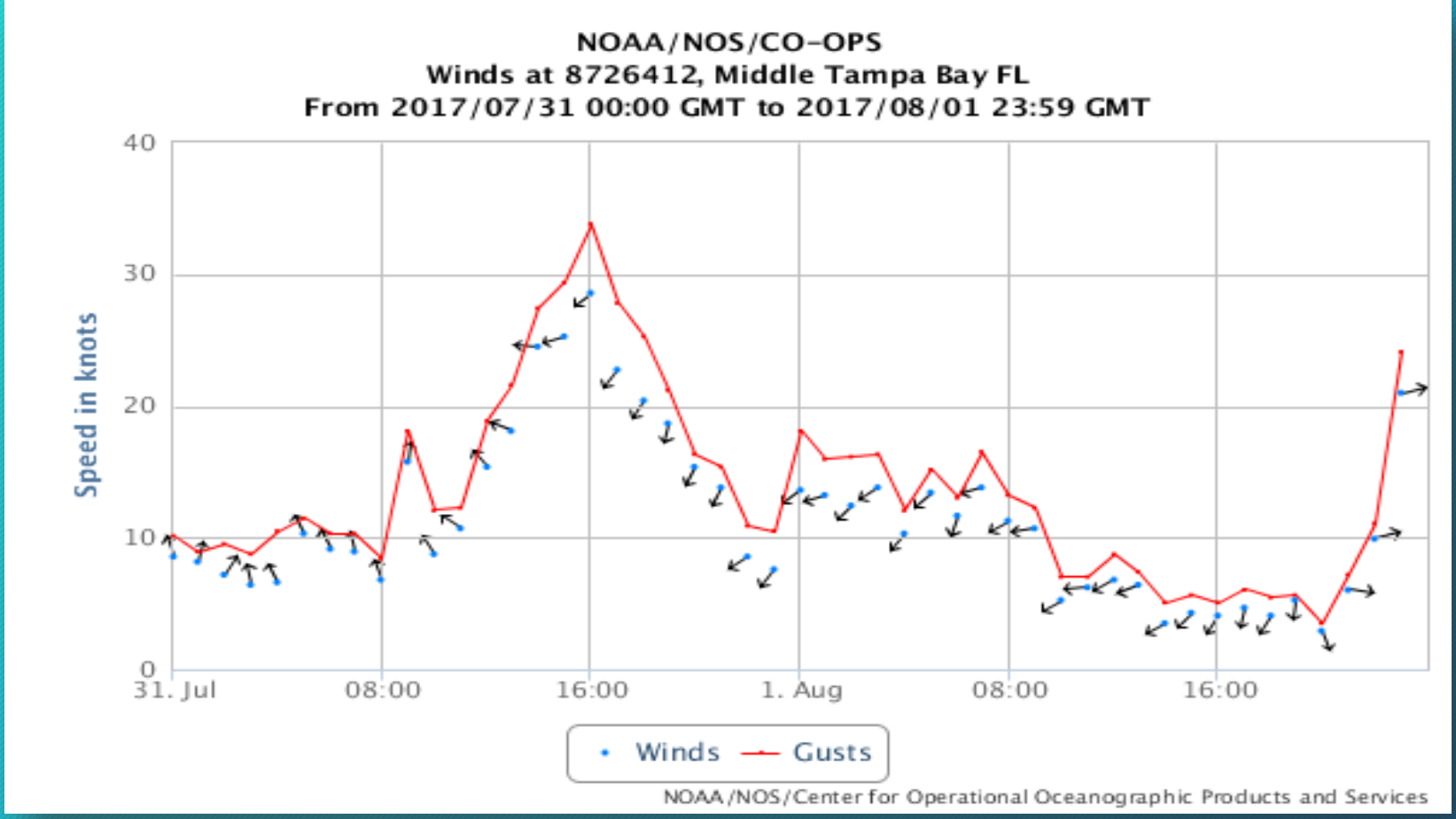


- Spun up very quickly over the warm gulf waters.
- Formed along a remnant frontal boundary.
- Impacts lasted about 6-12 hours.



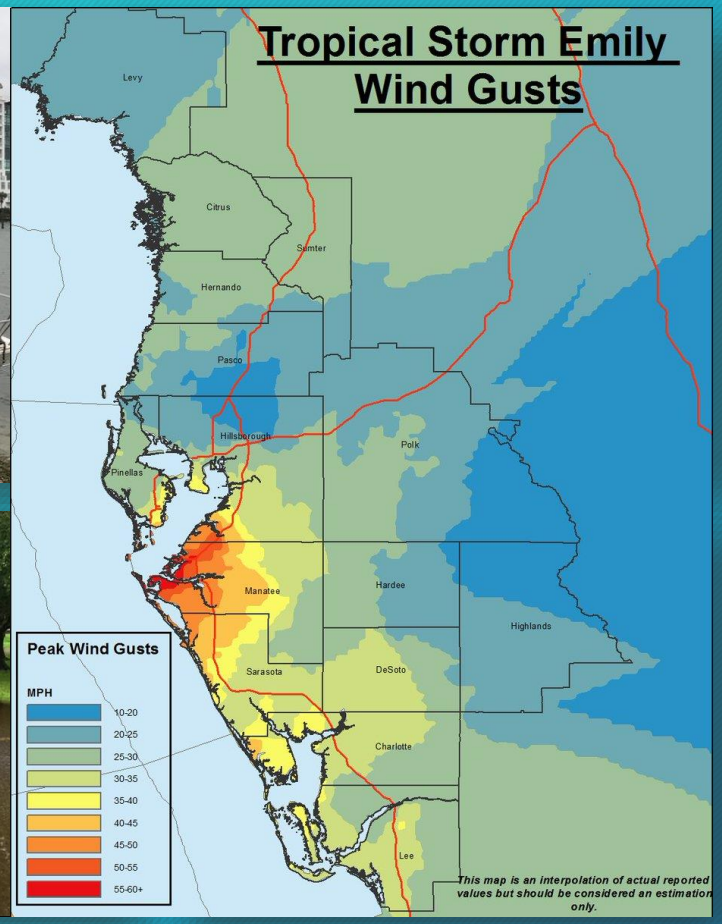


Emily's Wrath



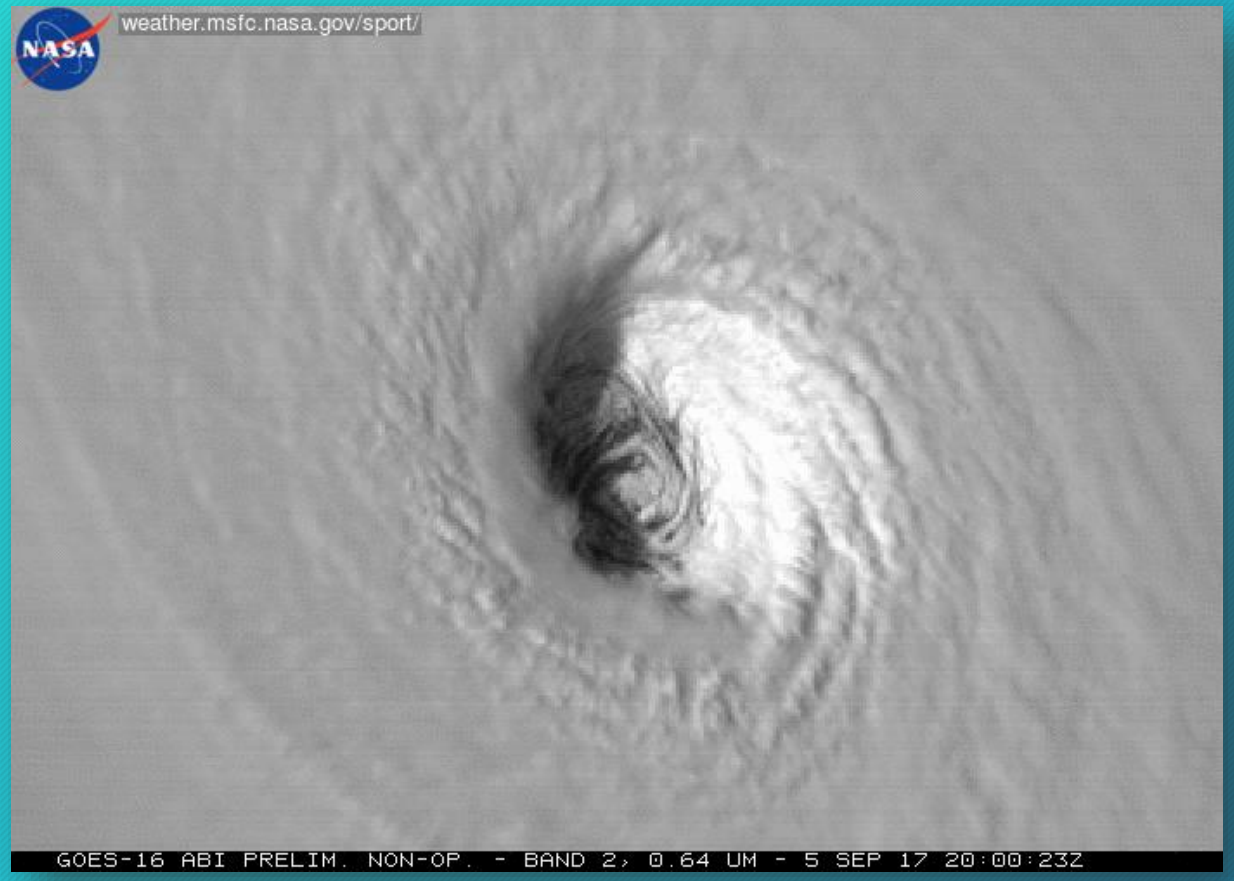
- Brief period of Gale force winds at Mid Tampa Bay Buoy.
- Near zero visibility due to rainbands.
- Skyway bridge closure.

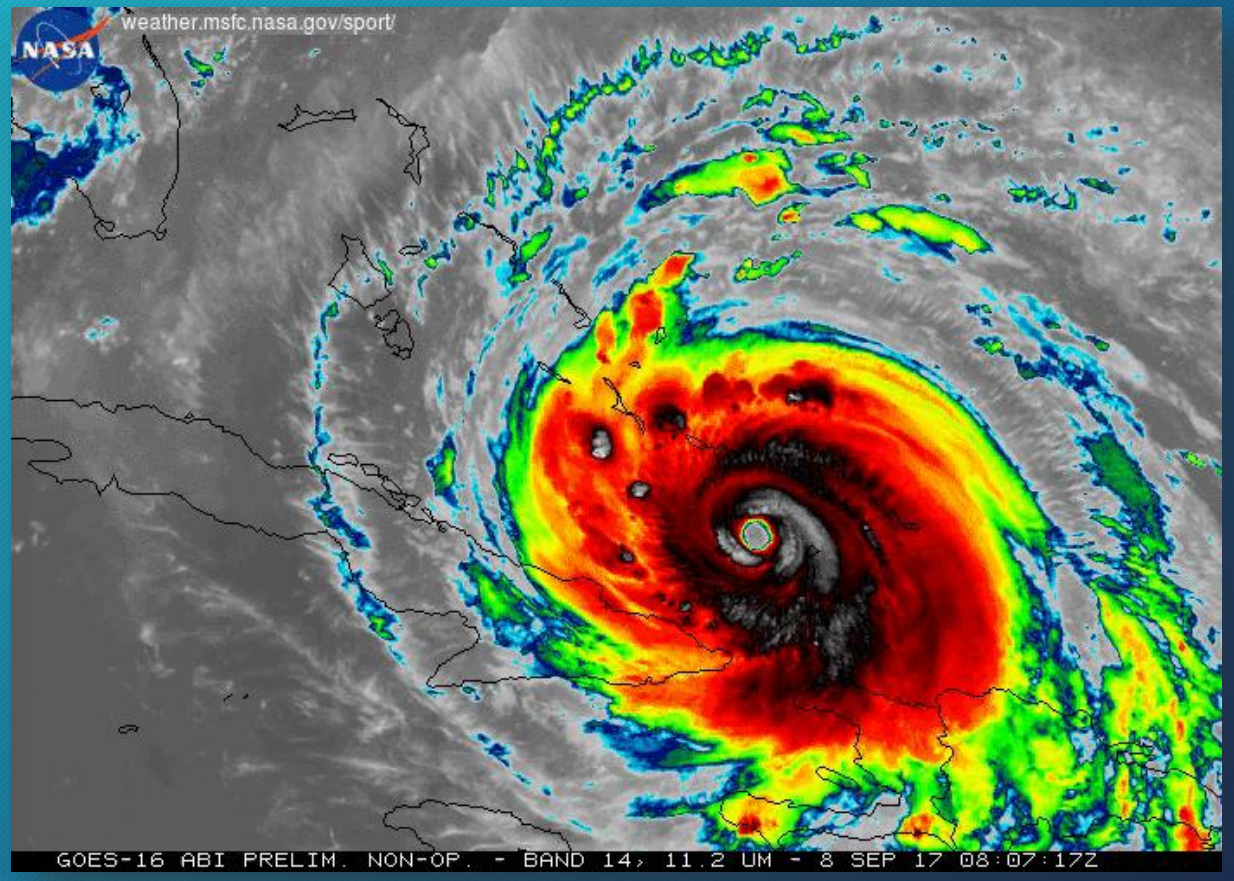
Emily's Wrath



- Minor damage reported across the region.
- Areas south of Tampa Bay hit hardest.
- Sarasota/Bradenton saw wind gusts of 50 to 60 mph.

HURRICANE IRMA – A Near Catastrophe

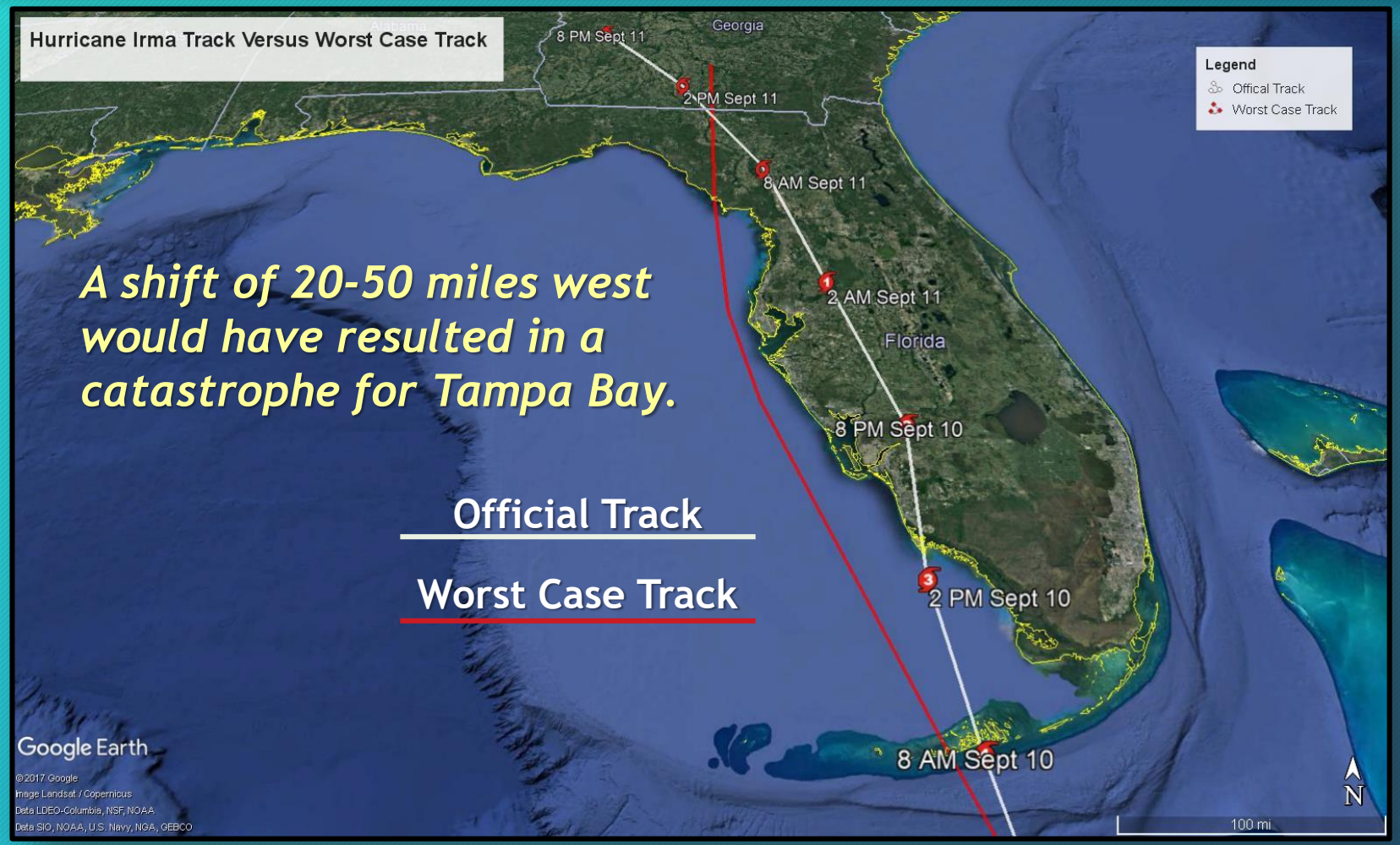




IRMA – The Disaster that Could Have Been

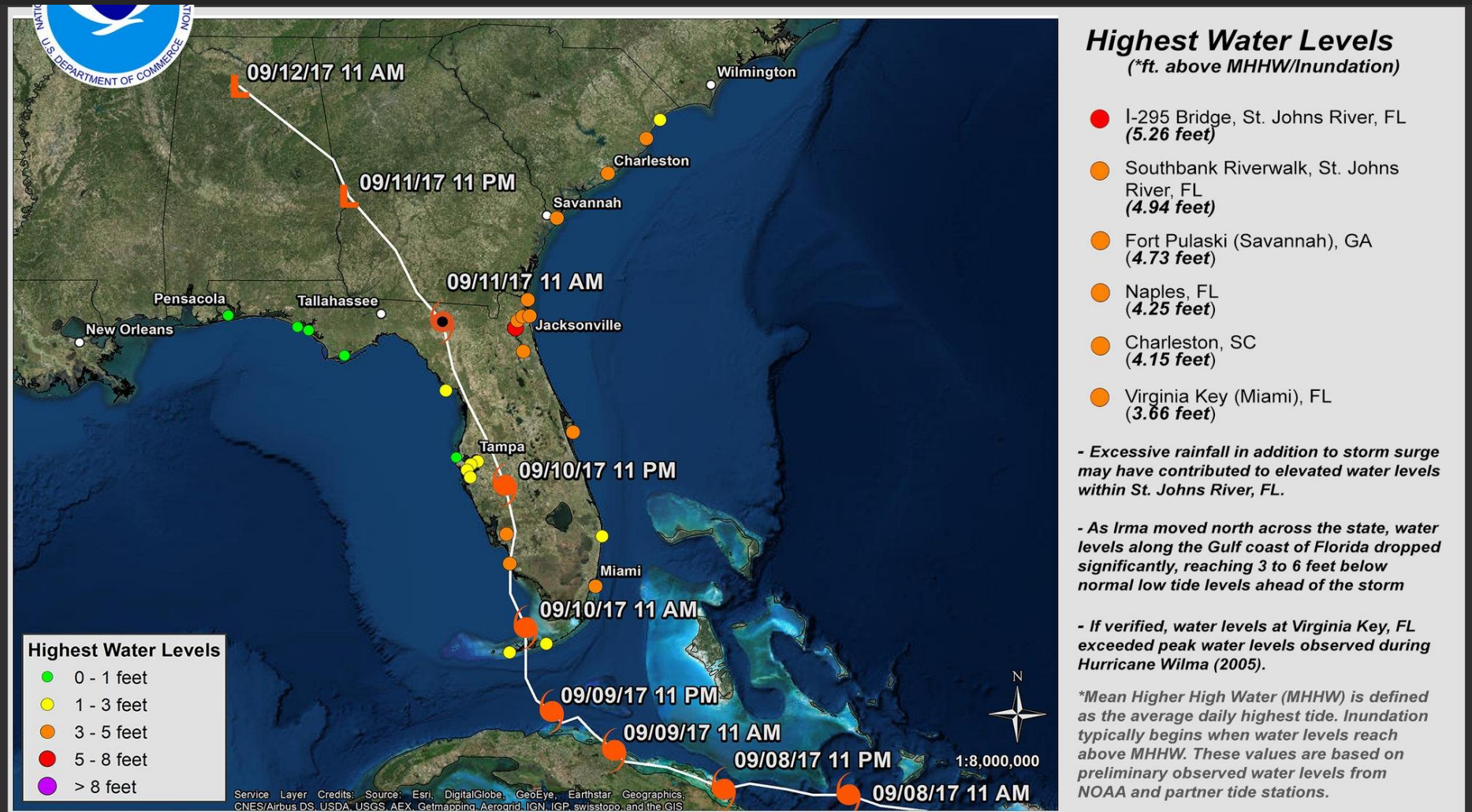
- Initial track was slightly farther east.
- Storm trended west with time, but fortunately came inland sooner than expected.
- Offshore winds vs onshore spared most of the coast from catastrophic surge.

IRMA – Very Nearly a Worst Case Scenario



- Northward turn saved Tampa Bay from experiencing the worst.
- Long period of strong offshore east/northeast winds instead of onshore.
- Only minor surge (~2-3 ft.) reported.
- Sustained TS winds with Hurricane force gusts.

IRMA – Storm Surge Inundation



Highest Water Levels

(*ft. above MHHW/Inundation)

- I-295 Bridge, St. Johns River, FL ***(5.26 feet)***
- Southbank Riverwalk, St. Johns River, FL ***(4.94 feet)***
- Fort Pulaski (Savannah), GA (***4.73 feet***)
- Naples, FL (***4.25 feet***)
- Charleston, SC (***4.15 feet***)
- Virginia Key (Miami), FL (***3.66 feet***)

- Excessive rainfall in addition to storm surge may have contributed to elevated water levels within St. Johns River, FL.

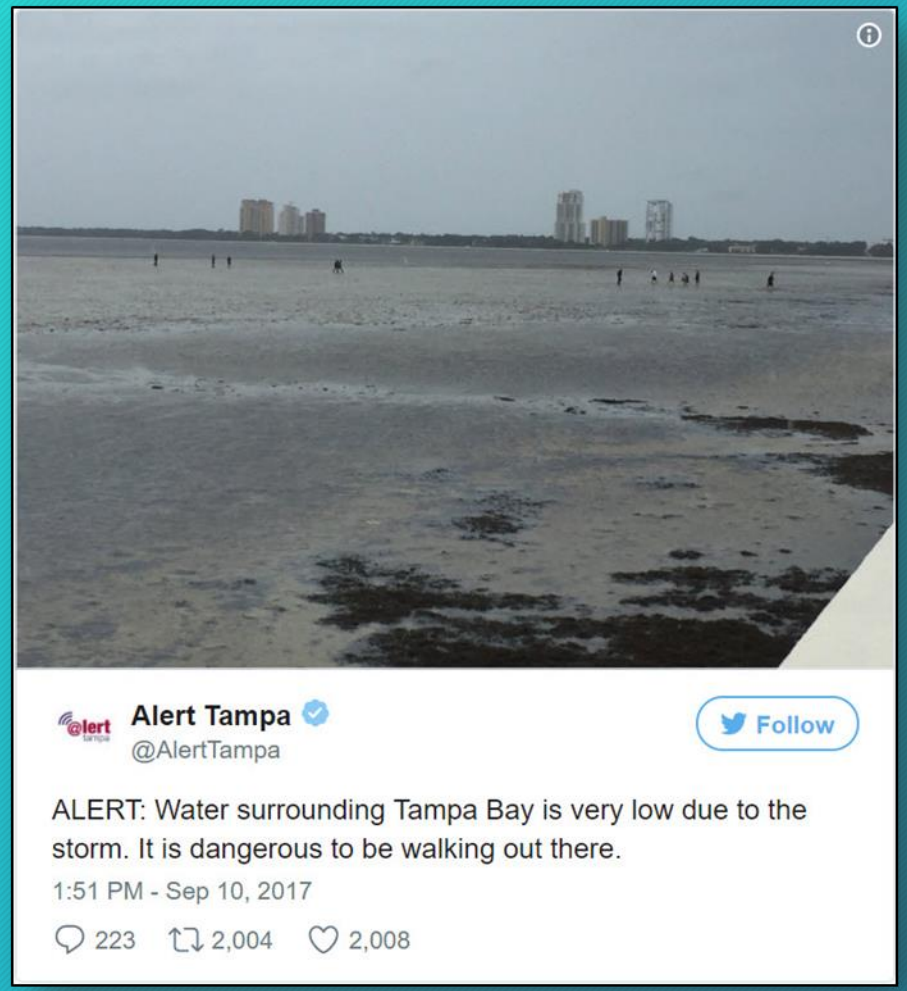
- As Irma moved north across the state, water levels along the Gulf coast of Florida dropped significantly, reaching 3 to 6 feet below normal low tide levels ahead of the storm

- If verified, water levels at Virginia Key, FL exceeded peak water levels observed during Hurricane Wilma (2005).

**Mean Higher High Water (MHHW) is defined as the average daily highest tide. Inundation typically begins when water levels reach above MHHW. These values are based on preliminary observed water levels from NOAA and partner tide stations.*

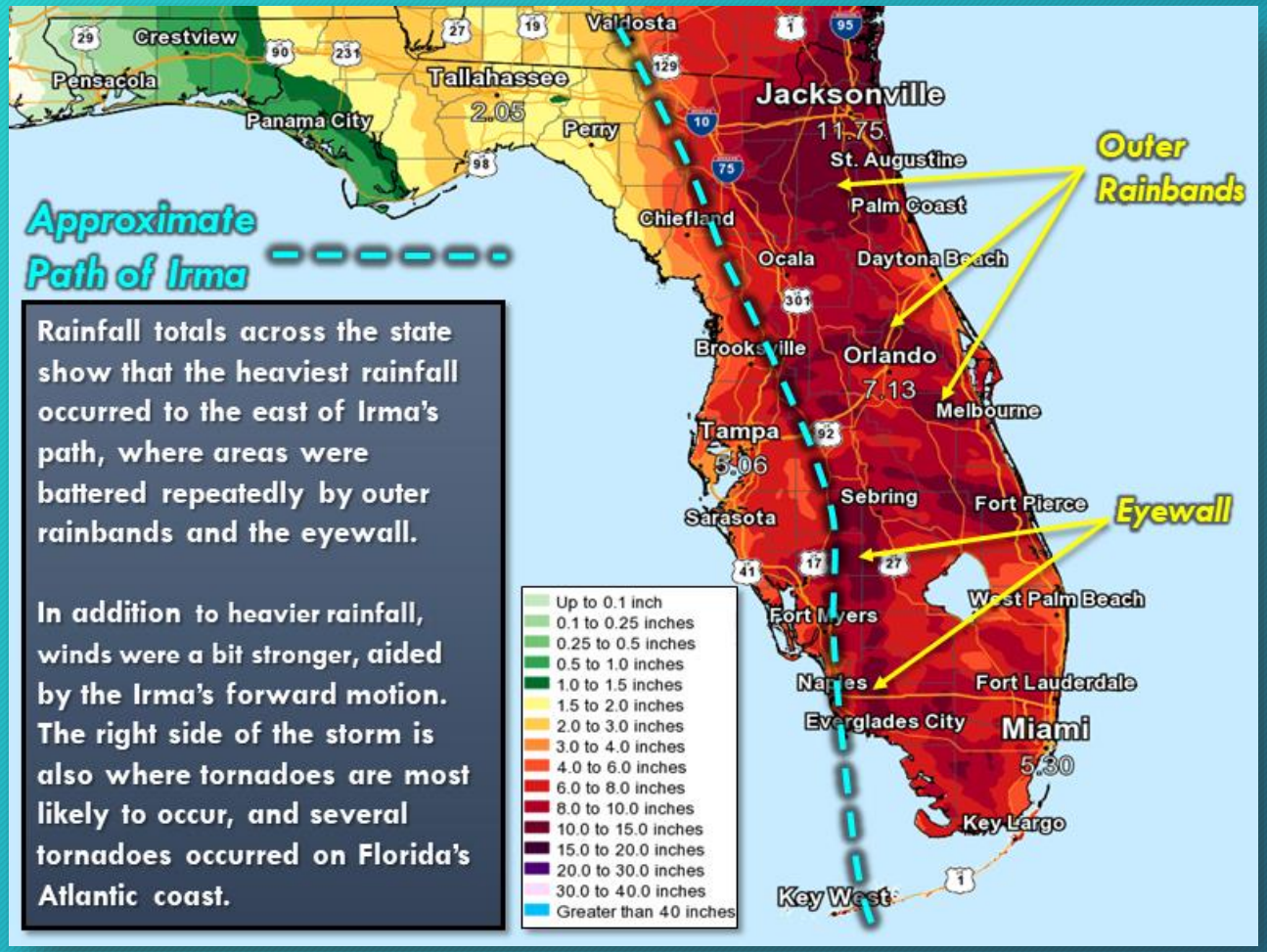
- More storm surge along the Atlantic coast and Southwest Florida (Naples/Marco Island).
- Worst in Jacksonville due to St Johns backing up.

IRMA - Antisurge

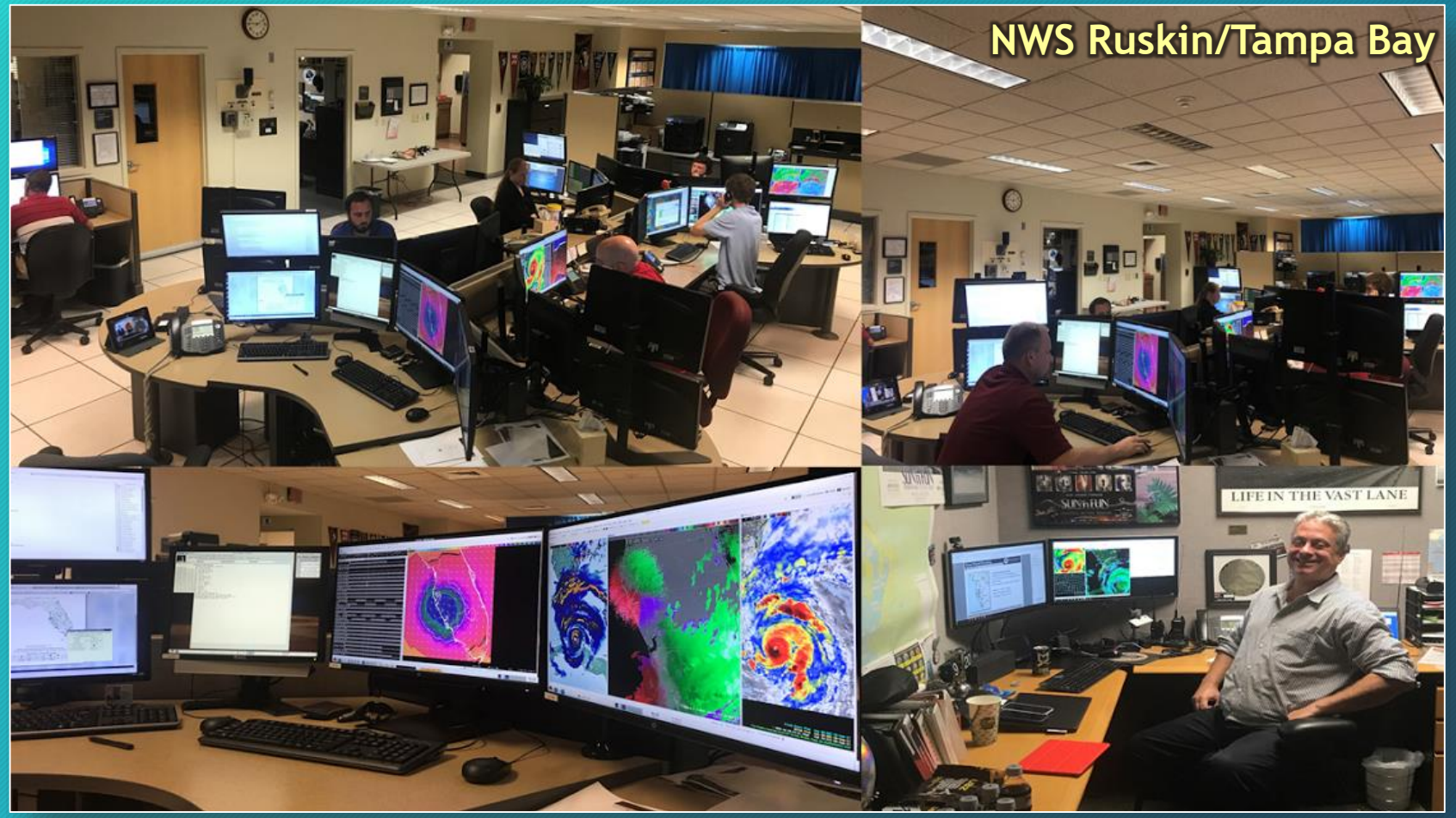


- Prolonged offshore winds resulted in water moving away from the coast.
- Lots of people wandering off onto the seafloor.

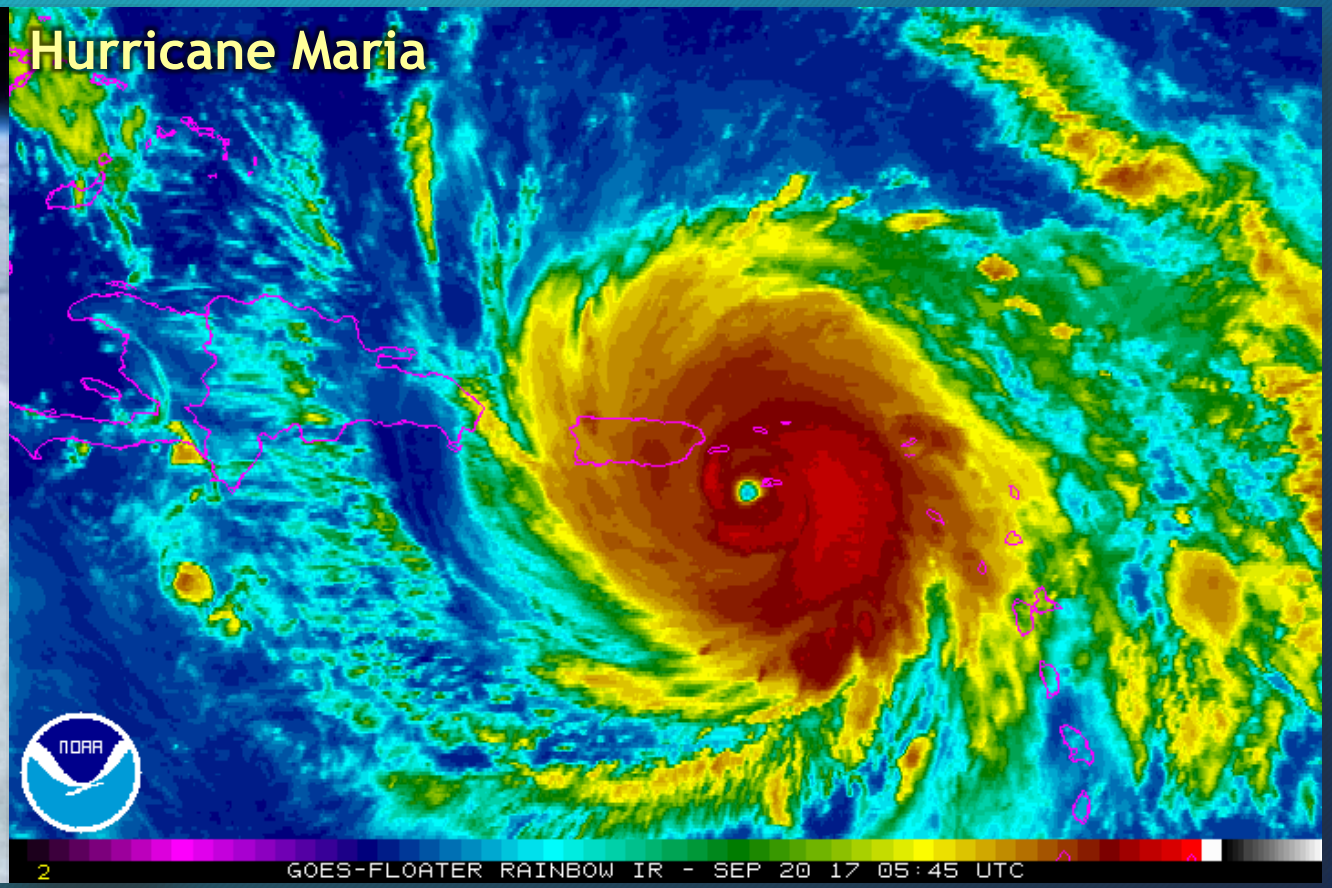
IRMA – Inland Flooding



IRMA – Hunkering Down

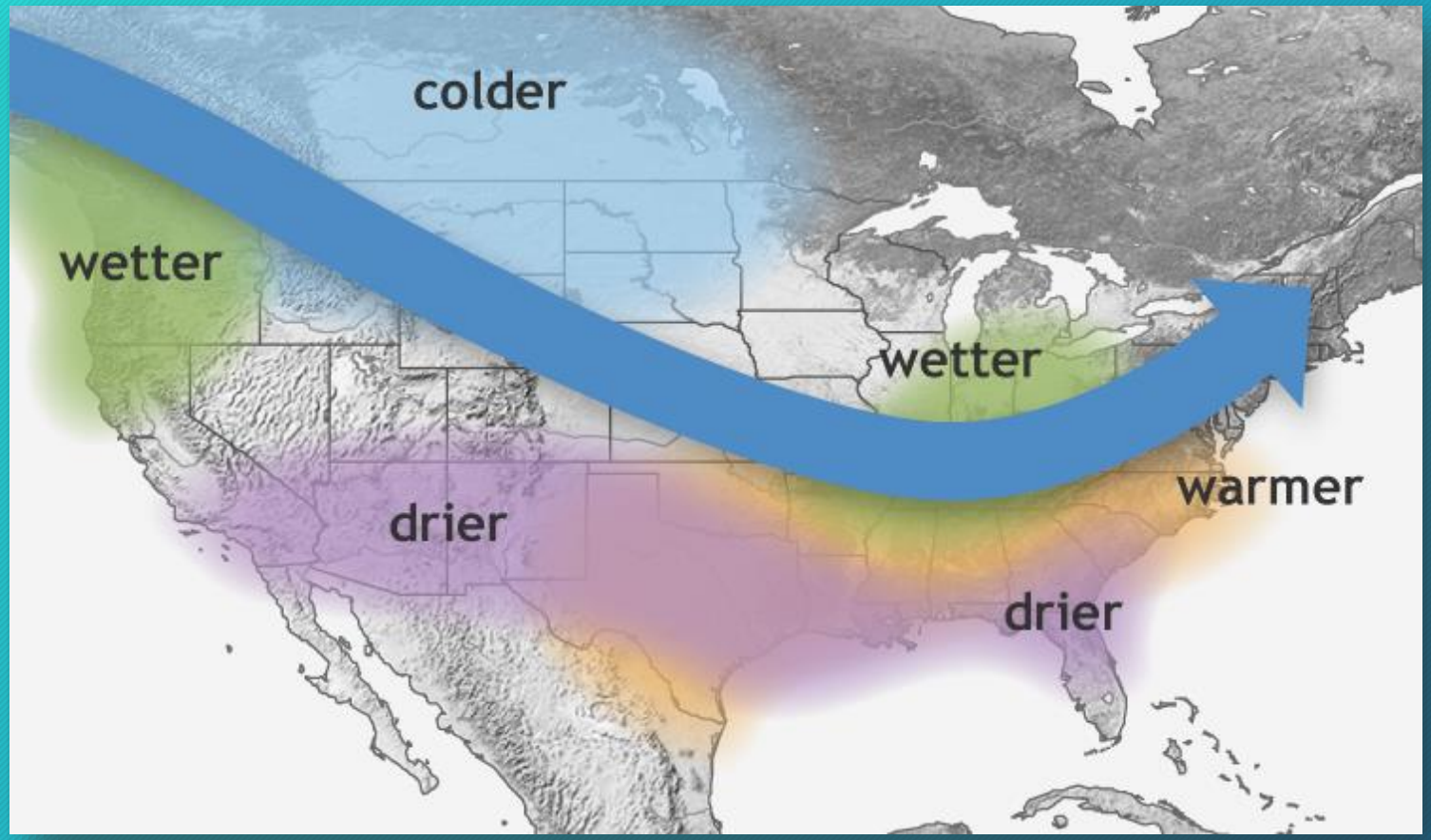


Other Notable Storms



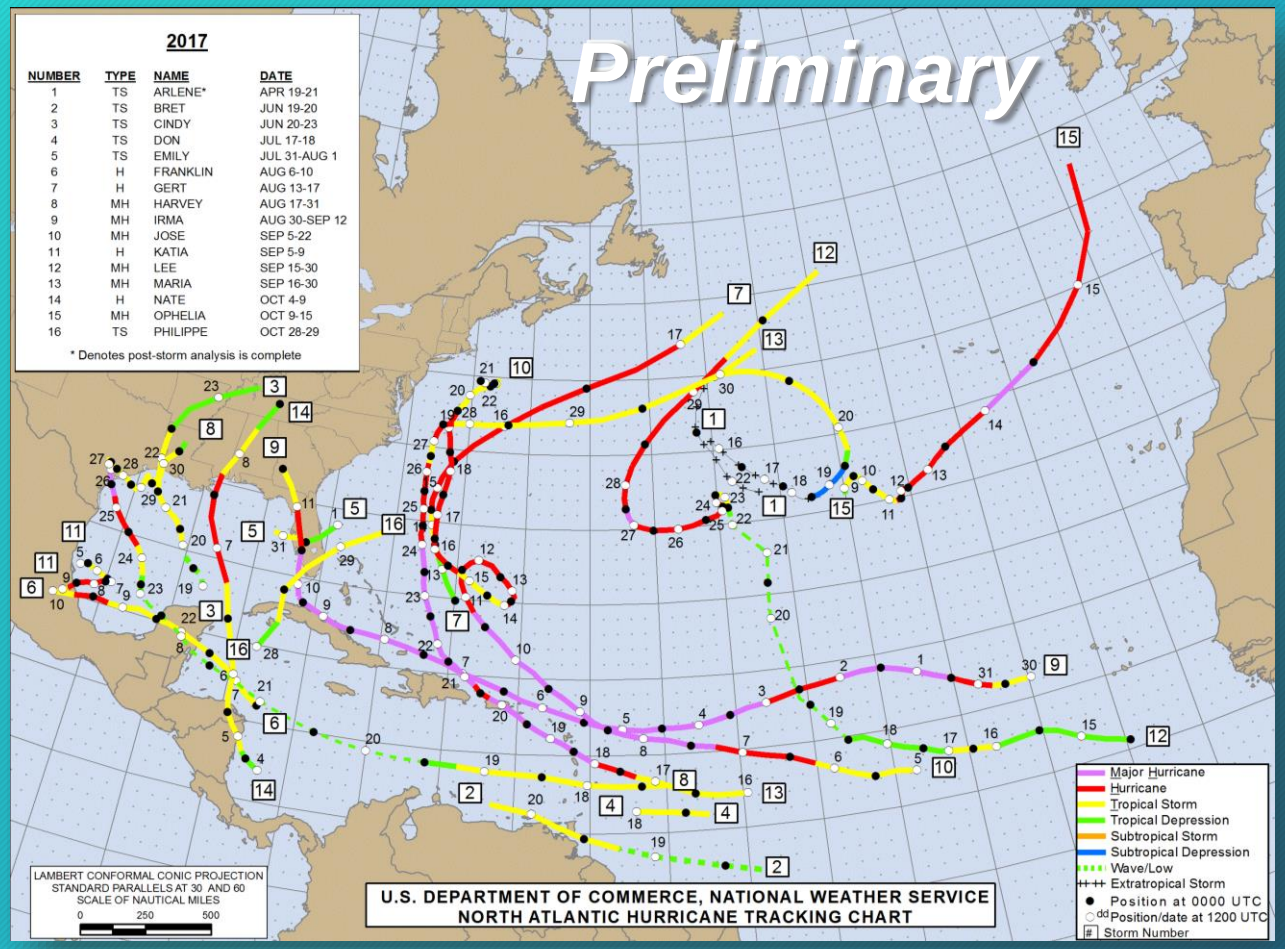
Other Notable Storms

Looking Ahead to Winter



- La Niña expected to last through winter.
- Drier and warmer than normal.
- Jet stream and low pressure systems stay north.
- Lesser potential for severe weather, but cold fronts/strong winds still possible.

The Season is Over in Two Days!



Hoping for a less busy season next year.

IF La Niña continues into next Summer/Fall, it will be busy again.

How Pennywise handles Hurricane Irma