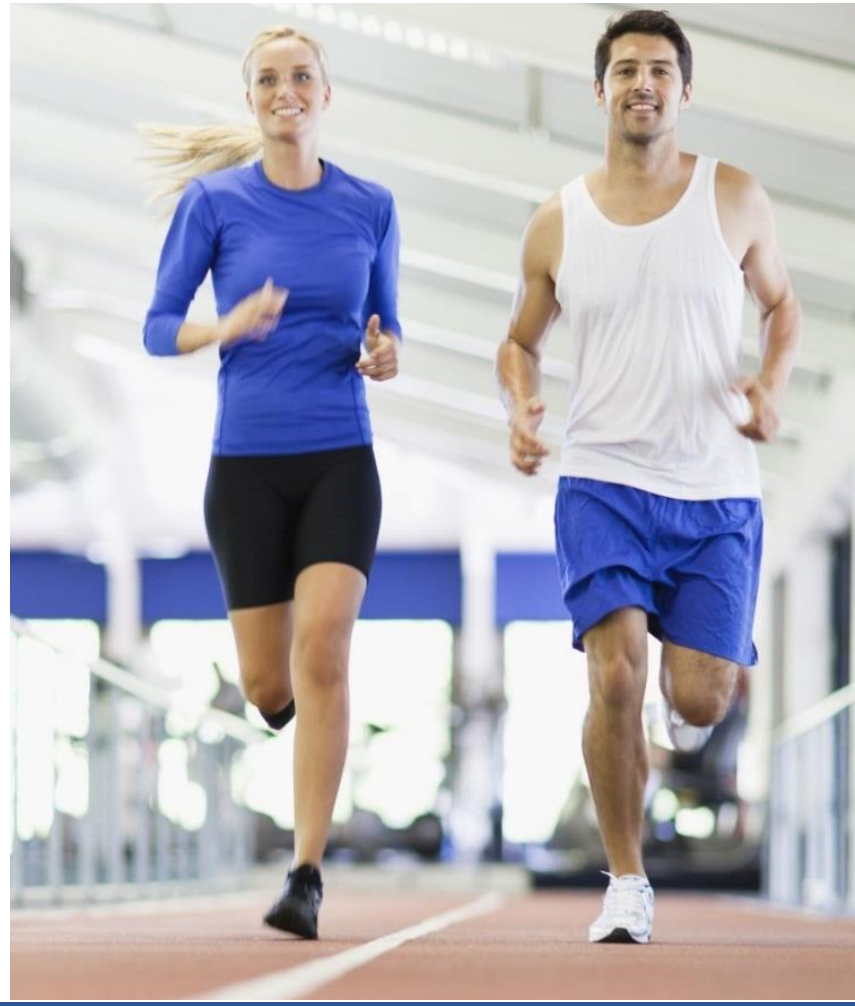
weather.gov/tampa/workouts



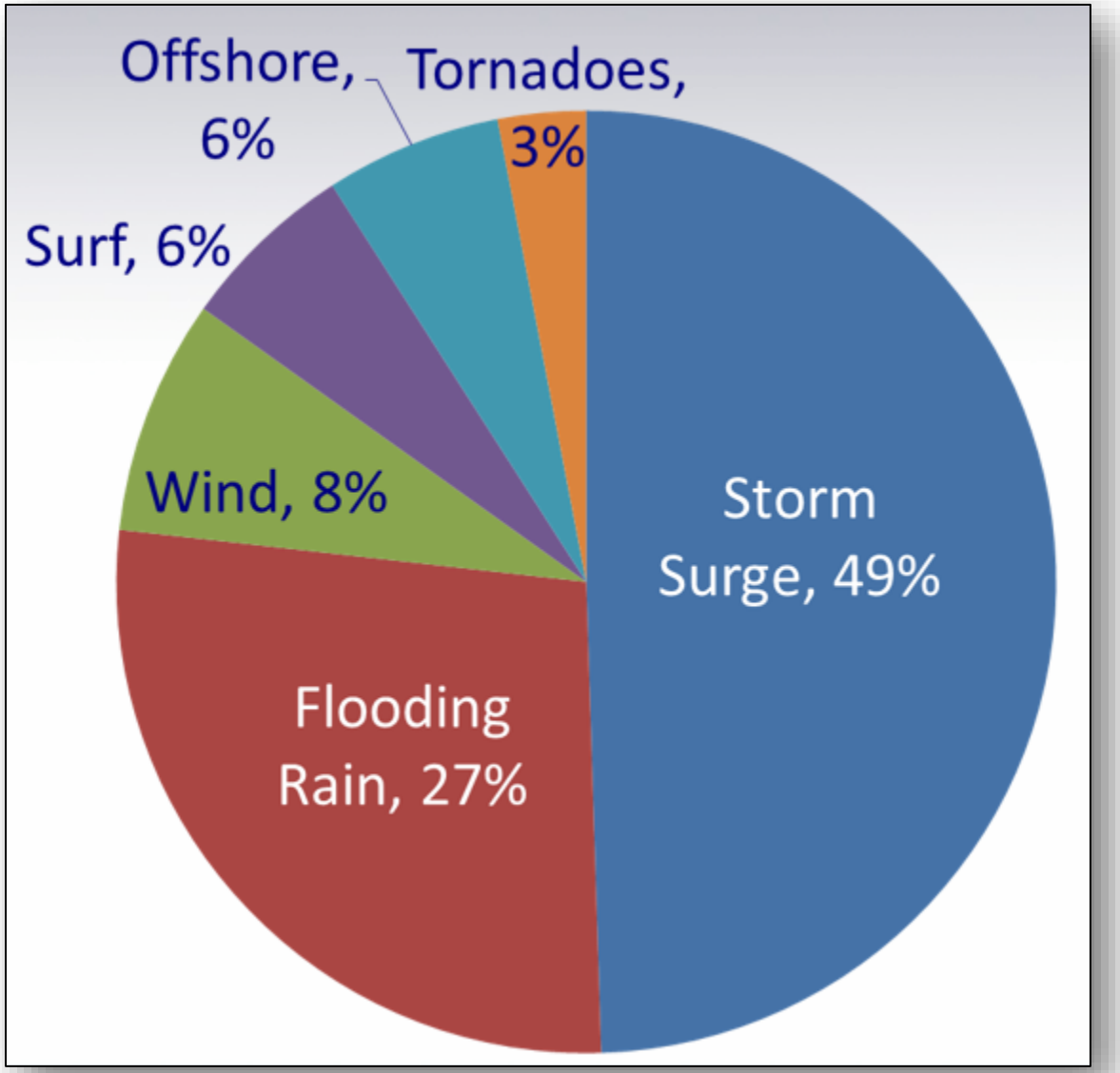
Weather Workout – Storm Surge, River Forecasting

NWS TAMPA BAY (RUSKIN, FL)

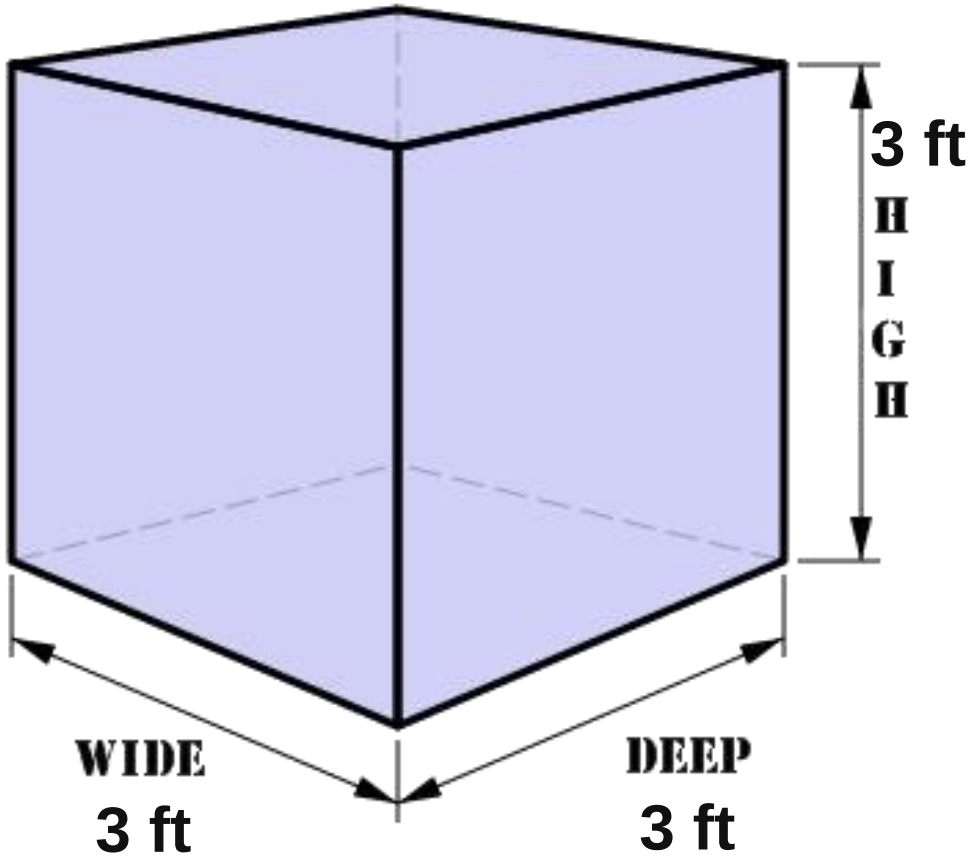
FEBRUARY 23, 2021

HTTPS://WEATHER.GOV/TAMPA/WORKOUTS

U.S. Hurricane Fatalities from 1963-2015

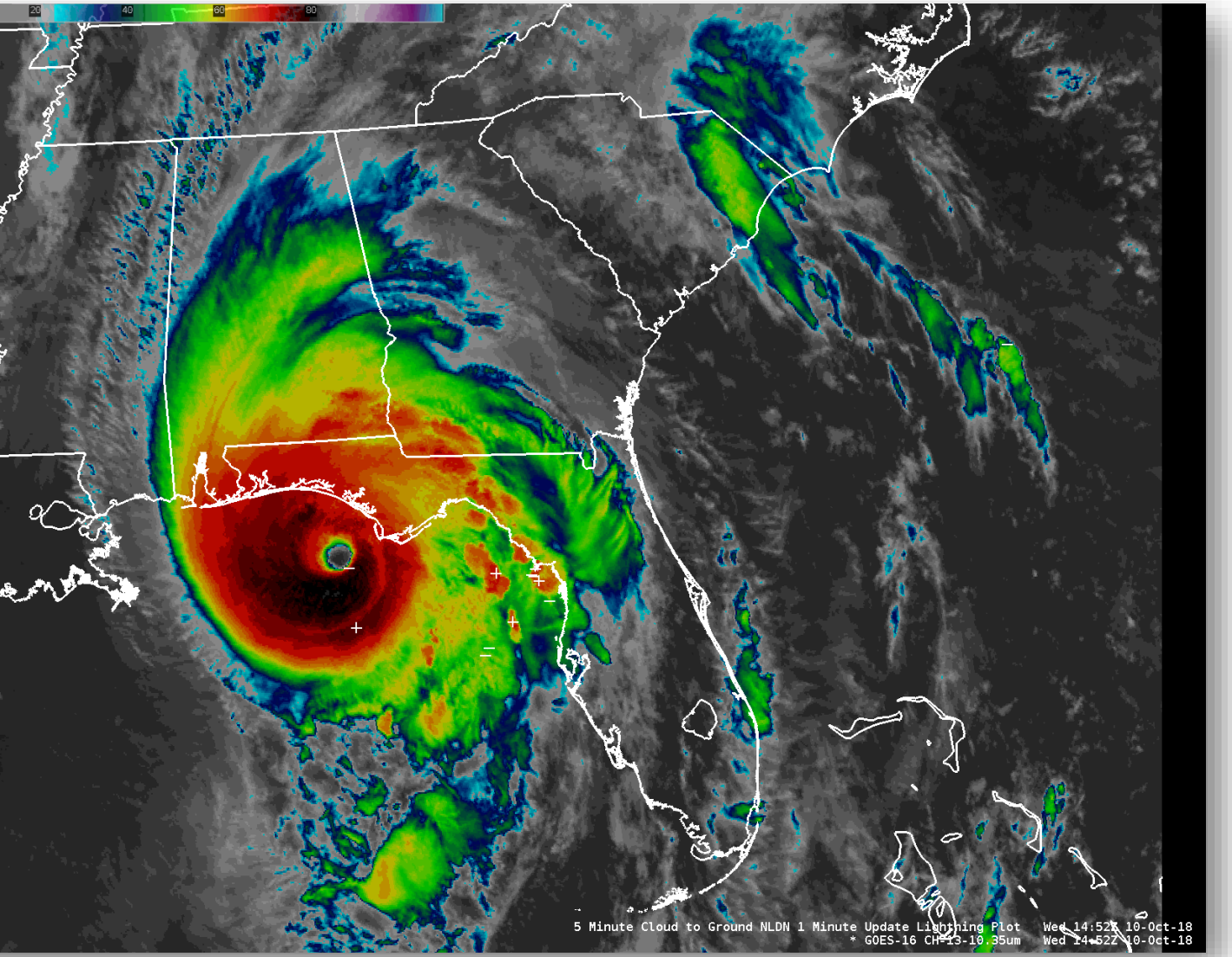


Water is Heavy, Moving Water can be Deadly



1 cubic yard of water weighs 1,700 pounds!

2018 Major Hurricane Michael

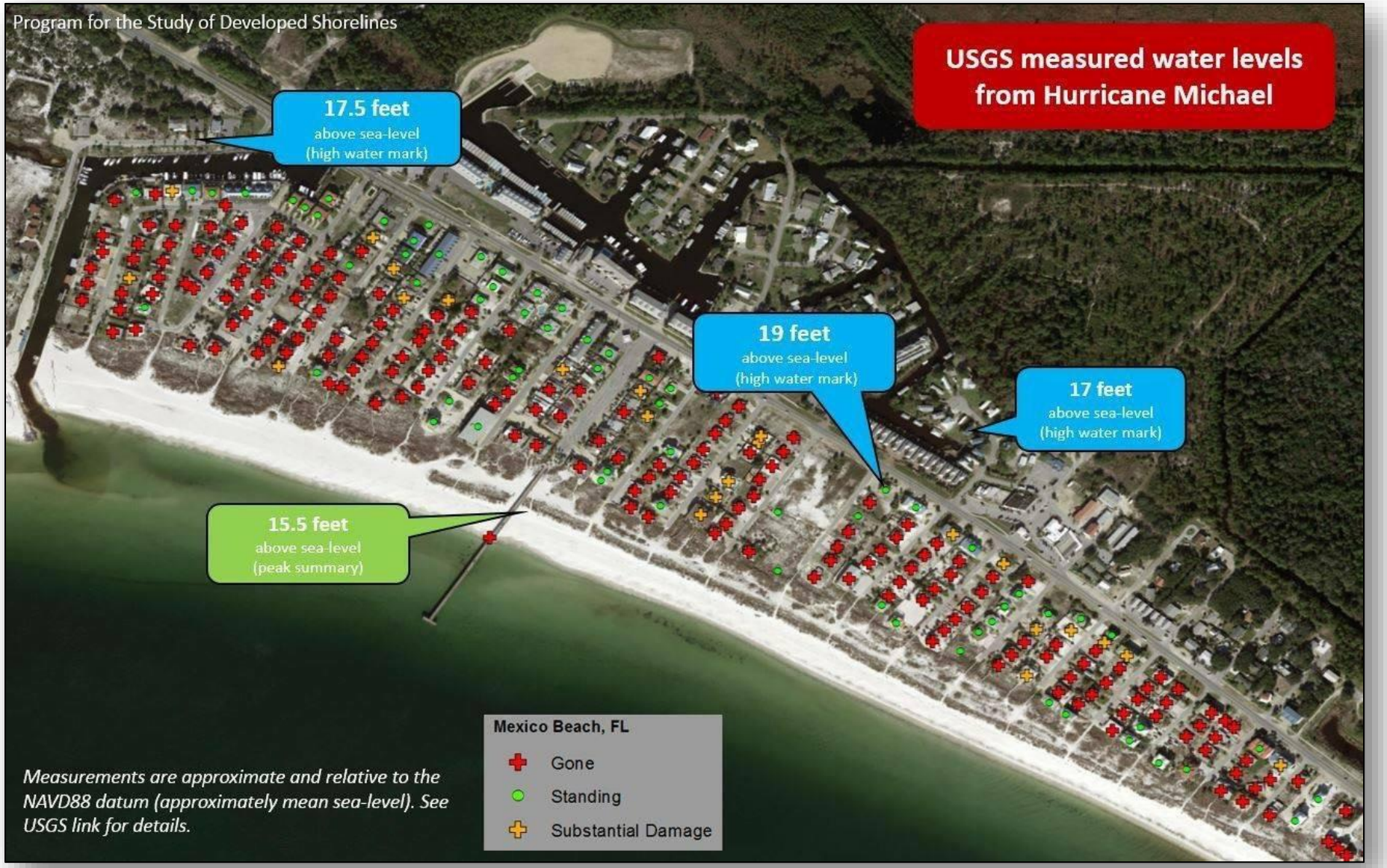


- CAT 5 with 160 mph wind
- Surge, tide, and waves reached 19 feet at Mexico Beach
- At least 59 people killed in the United States
- 4th CAT 5 to hit the United States

Storm Surge Mexico Beach, FL on 10/10/2018

Instagram.com/talarico.tessa

Every Red Dot on Map is a Home Washed Off Foundation

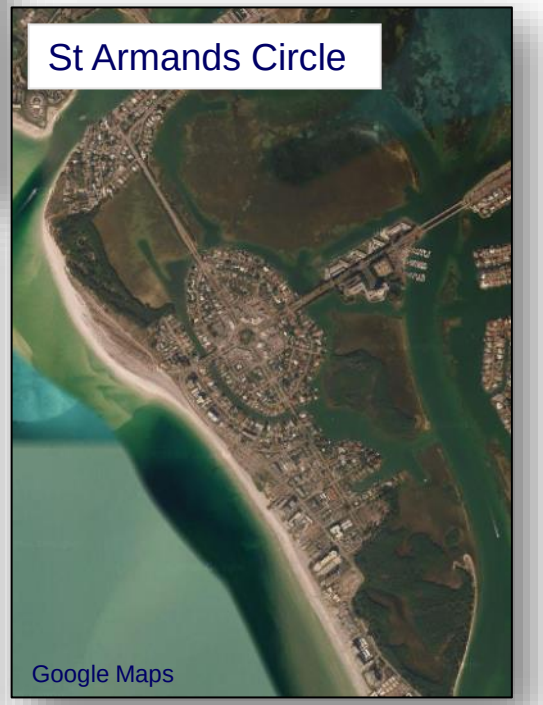


On the Ground in Mexico Beach

Mexico Beach Storm Surge Debris

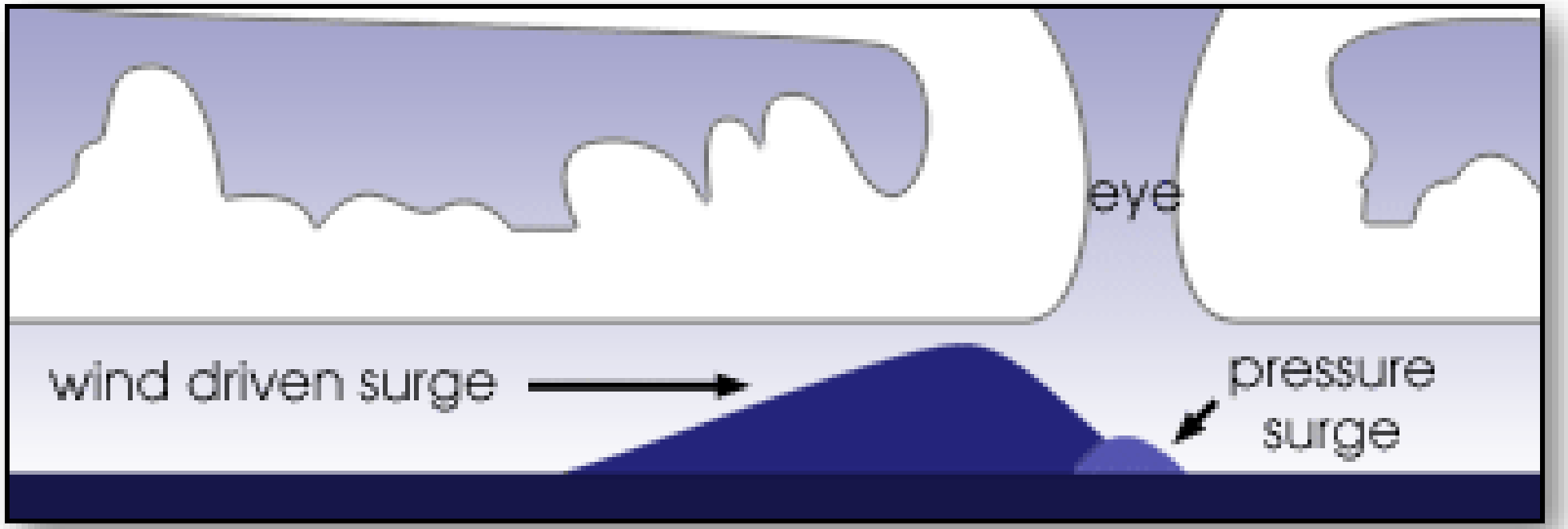
Our Barrier Islands are no Different

Our chance of a storm surge over 15 feet is about 0.5% each year



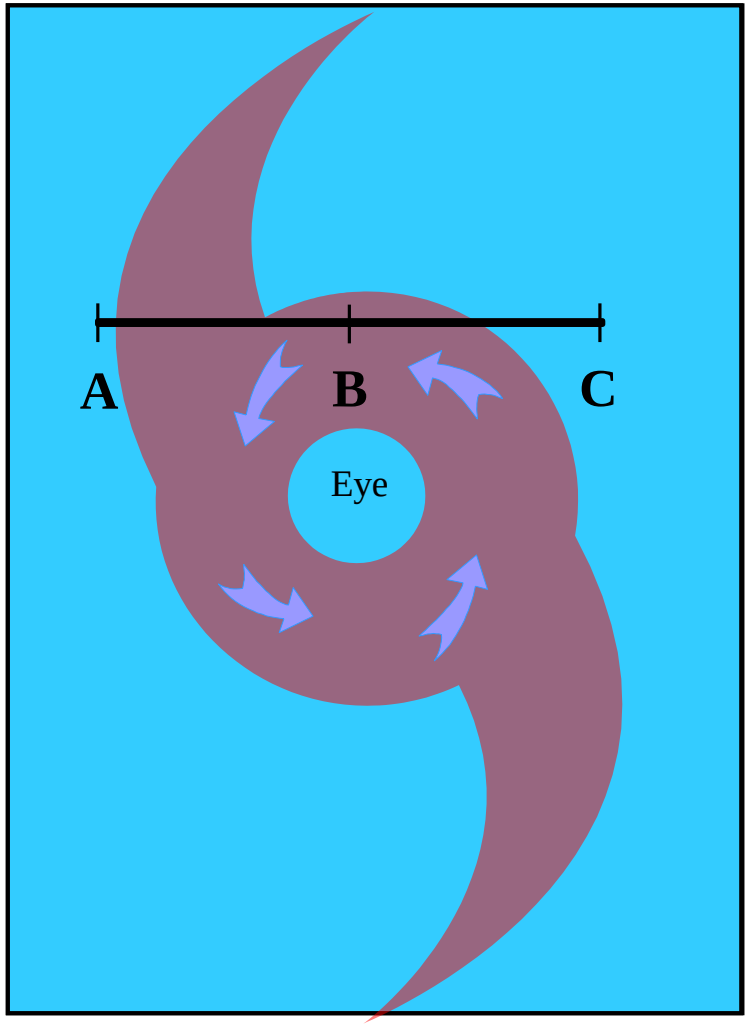
Storm Surge

• Lower central pressure associated with the storm causes the ocean to rise/bulge up
• However, the contribution of pressure to total storm surge is small compared to wind

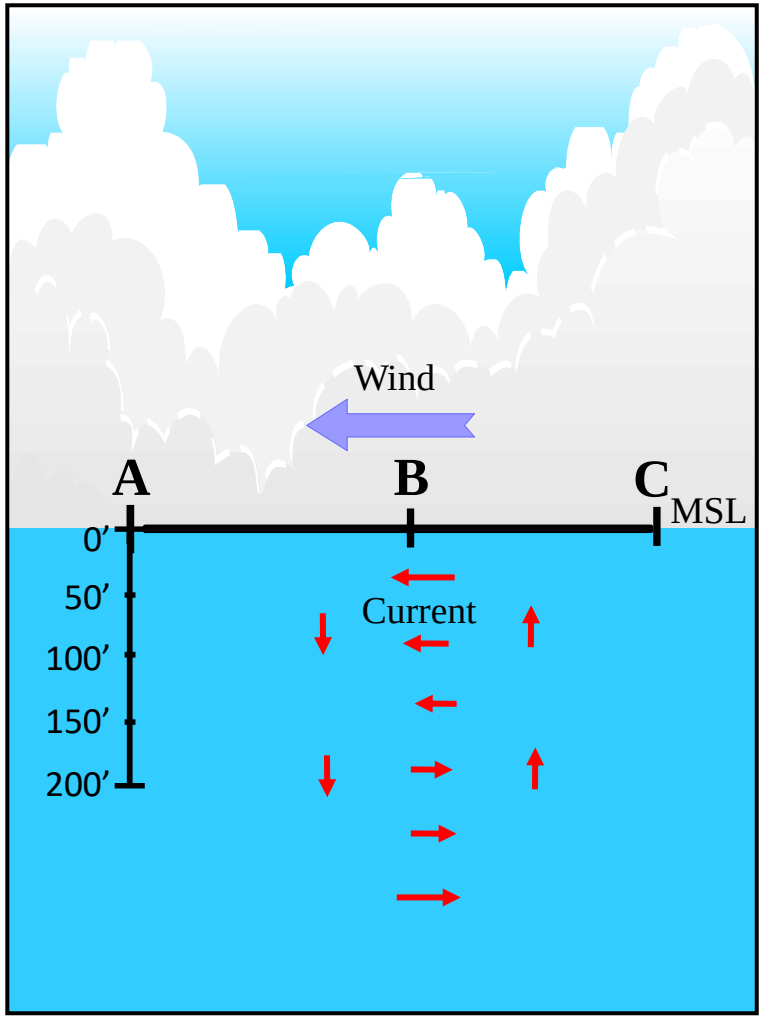


Currents in Deep Water

a. Top View of Sea Surface

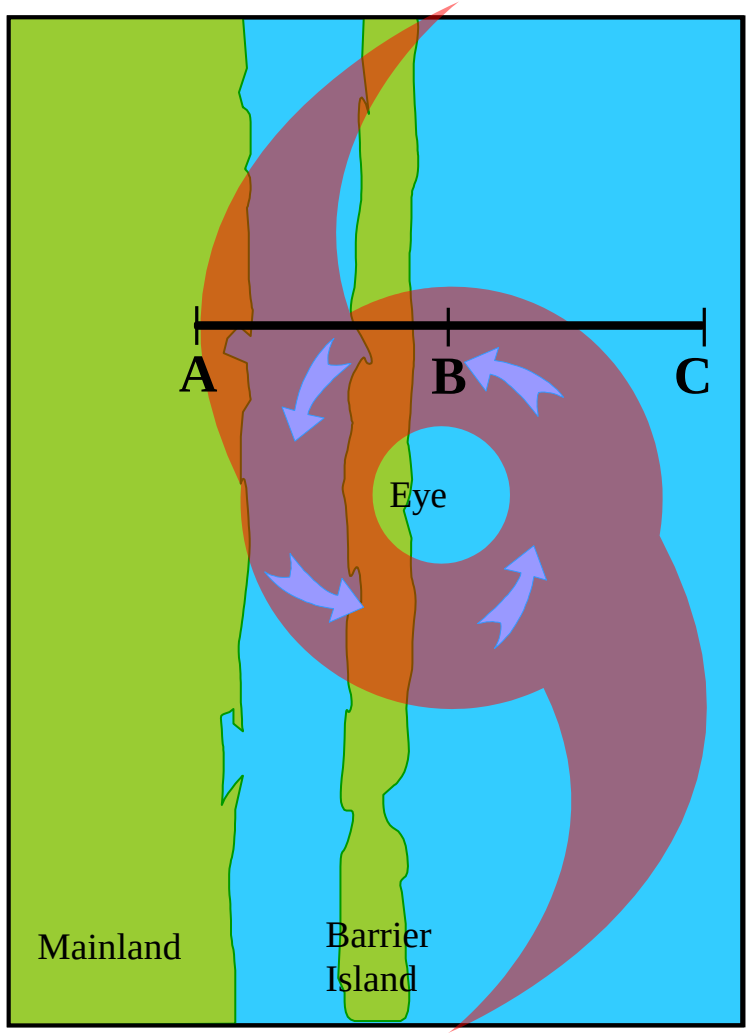


b. Side View of Cross Section "ABC"

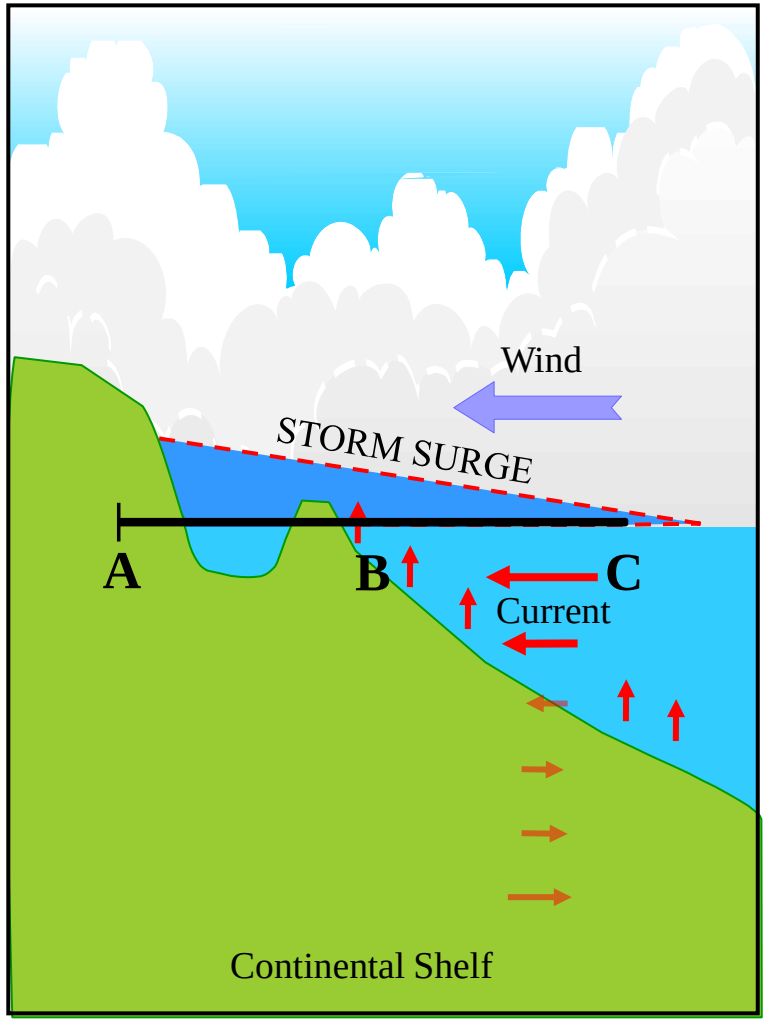


Currents in Shallow Water

a. Top View of Sea Surface



b. Side View of Cross Section "ABC"

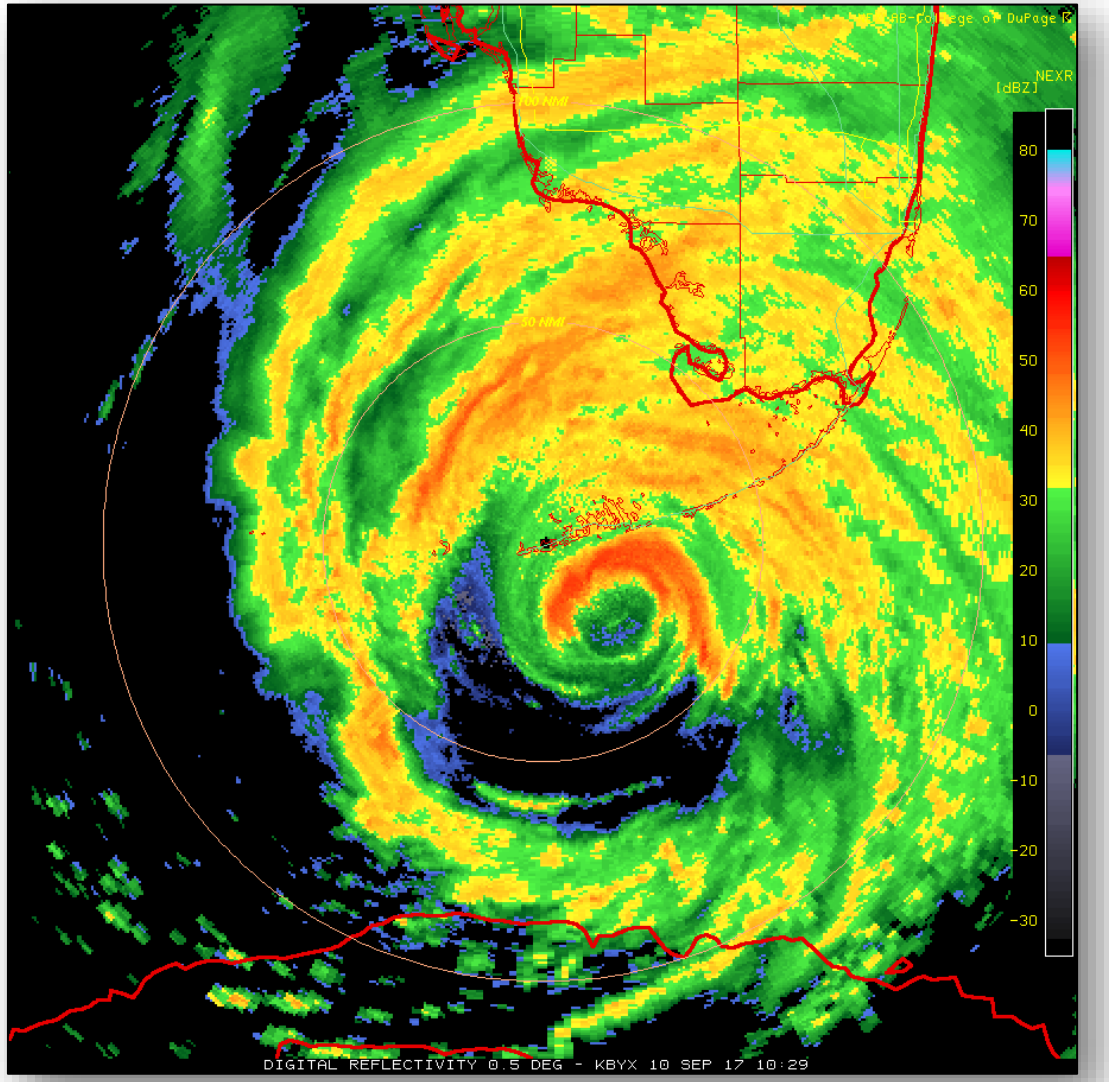


Storm Surge Generalizations

Bay Shore Blvd in Tampa as 1985 Hurricane Elena stalled 100 miles to the northwest

- More intense storms cause higher surges
- Highest surges usually occur to the right of the storm track
    - Wind is blowing surge onshore
- Storm Speed
    - Fast - higher surges along the open coast
    - Slow - greater flooding inside bays and estuaries

Storm Surge Generalizations



- Larger storms affect longer stretches of coastline
- Direction of storm approach often impacts the extent of flooding
- Slope of the continental slope affects surge and waves
  - Shallow slopes (West Florida) allow greater storm surge with small waves
  - Steeper slopes (Miami area) allow a bit lower surge but larger breaking waves can occur

2017 Hurricane Irma Storm Surge – Large Wind Field

Surge was 5-8 feet AGL in the Florida Keys

Highest surge was 6-10 feet AGL southeast of Naples. Surge was 3-5 ft AGL Naples to Fort Myers

Surge 4-6 ft AGL in parts of Miami-Dade County

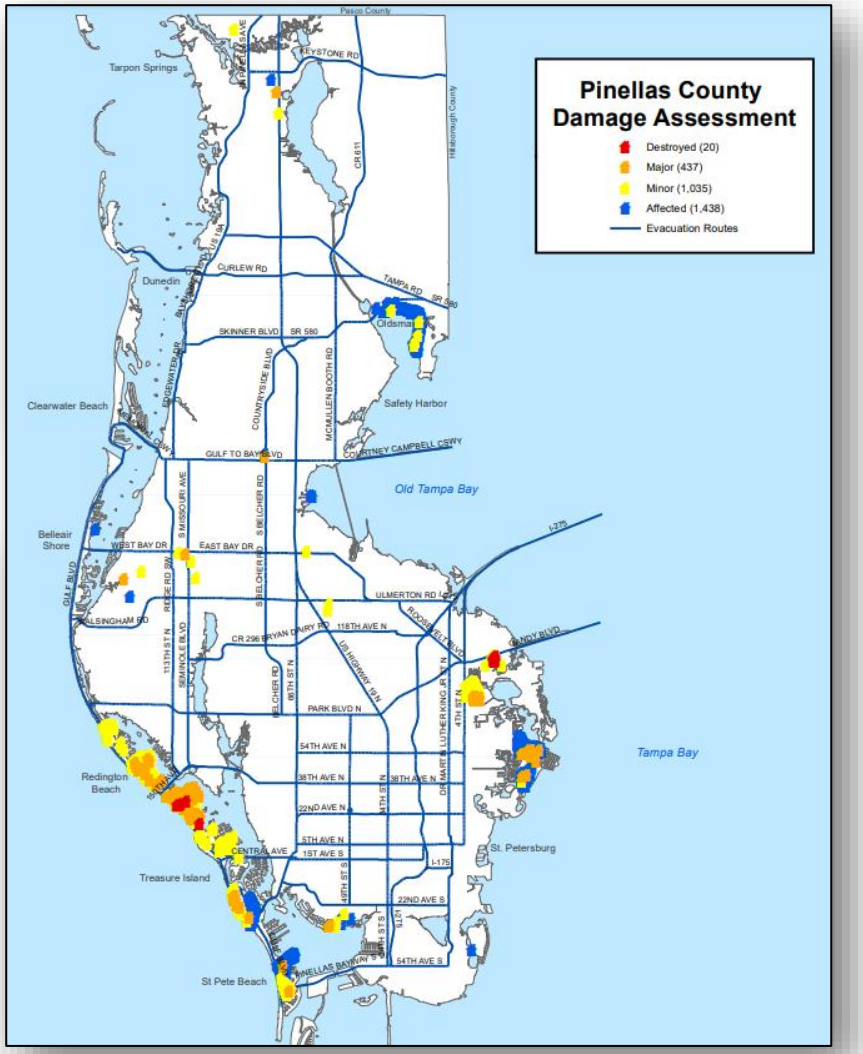
Surge 3-5 ft AGL from Cape Canaveral through Jacksonville

2020 Tropical Cyclone Eta – 4 to 5 ft AGL

Fort Myers

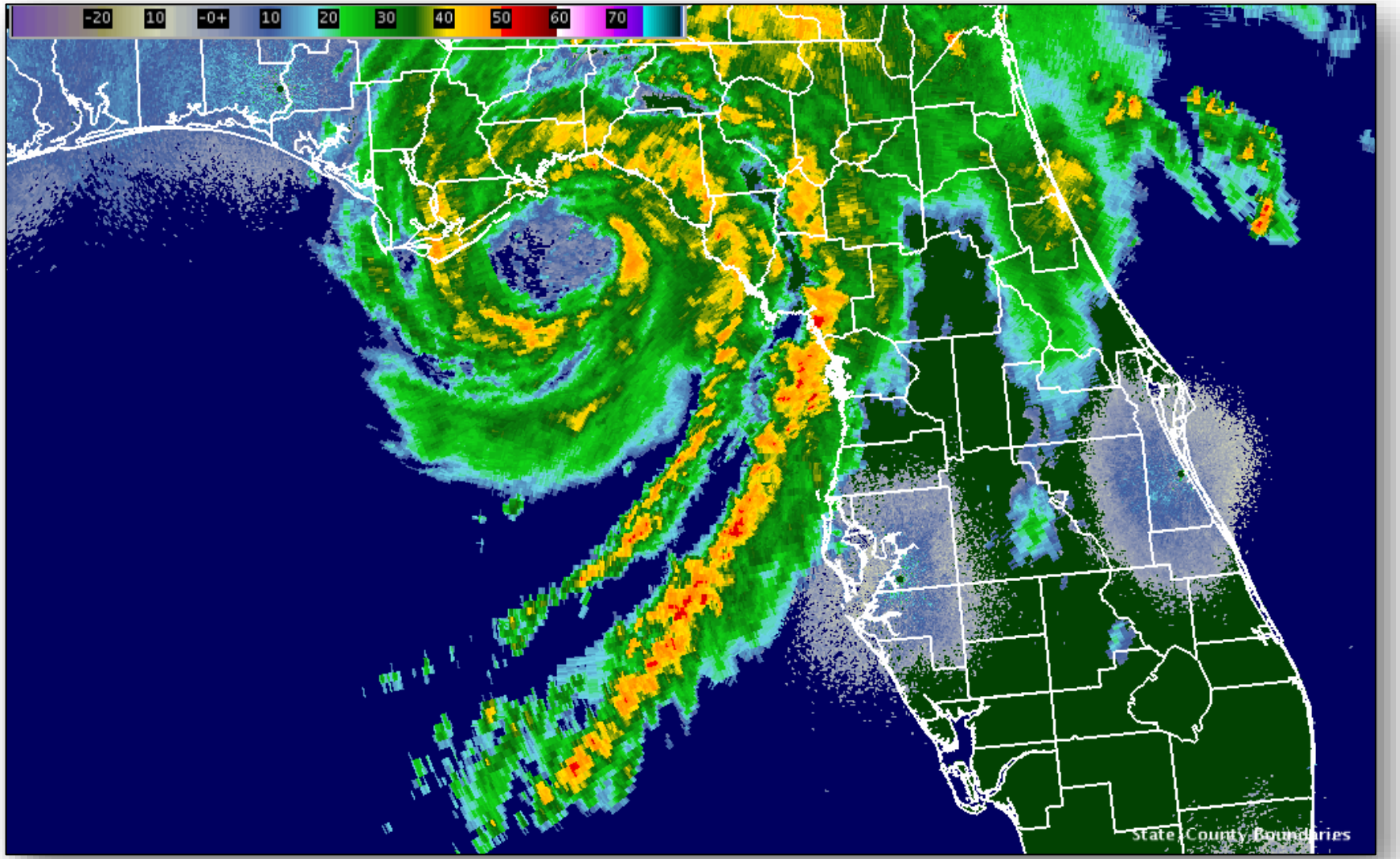
Courtney Campbell Causeway

Safety Harbor



Pinellas County Surge Flooding

2016 Hurricane Hermine Radar Loop

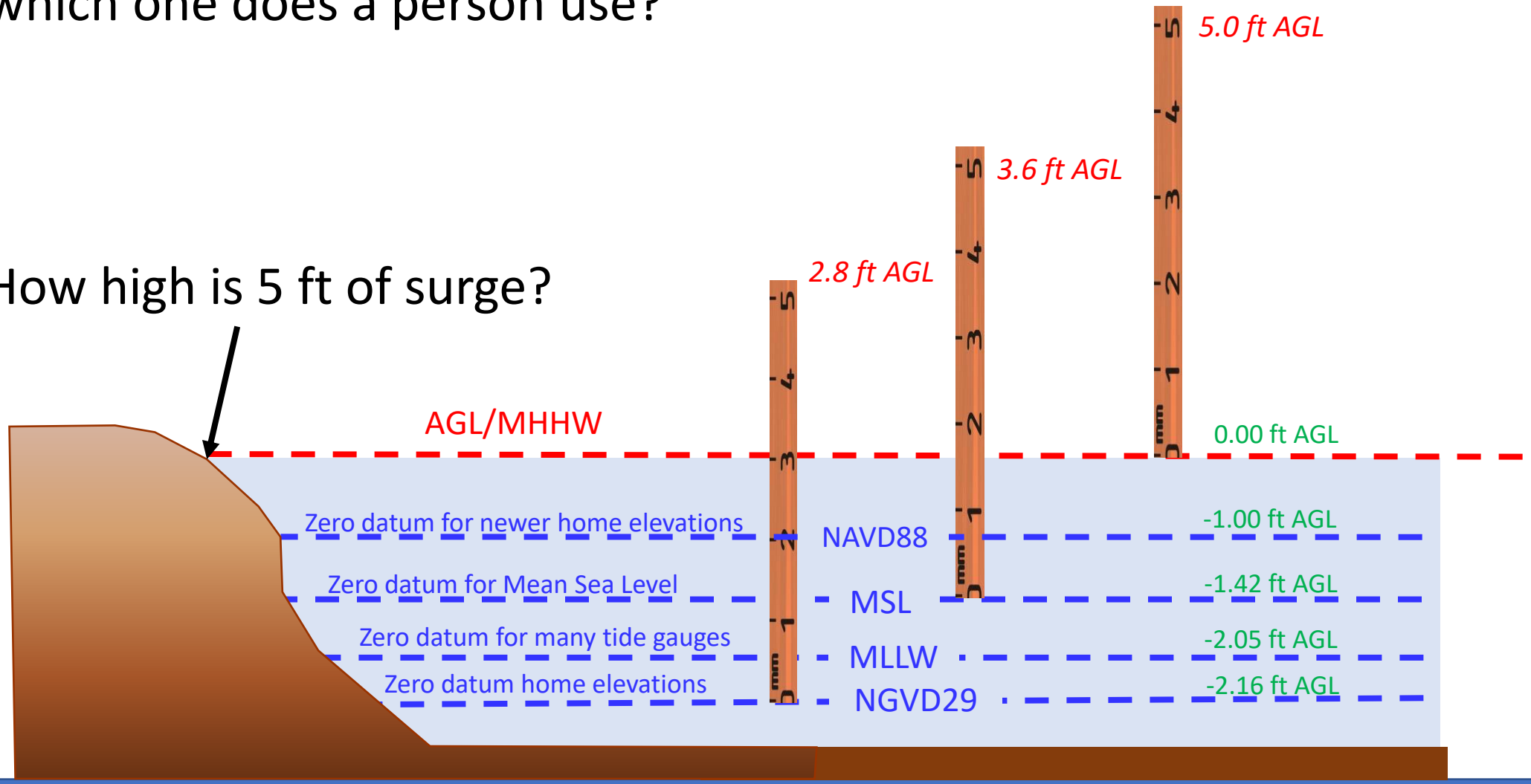


Cedar Key 6 foot AGL Surge (above MHHW)

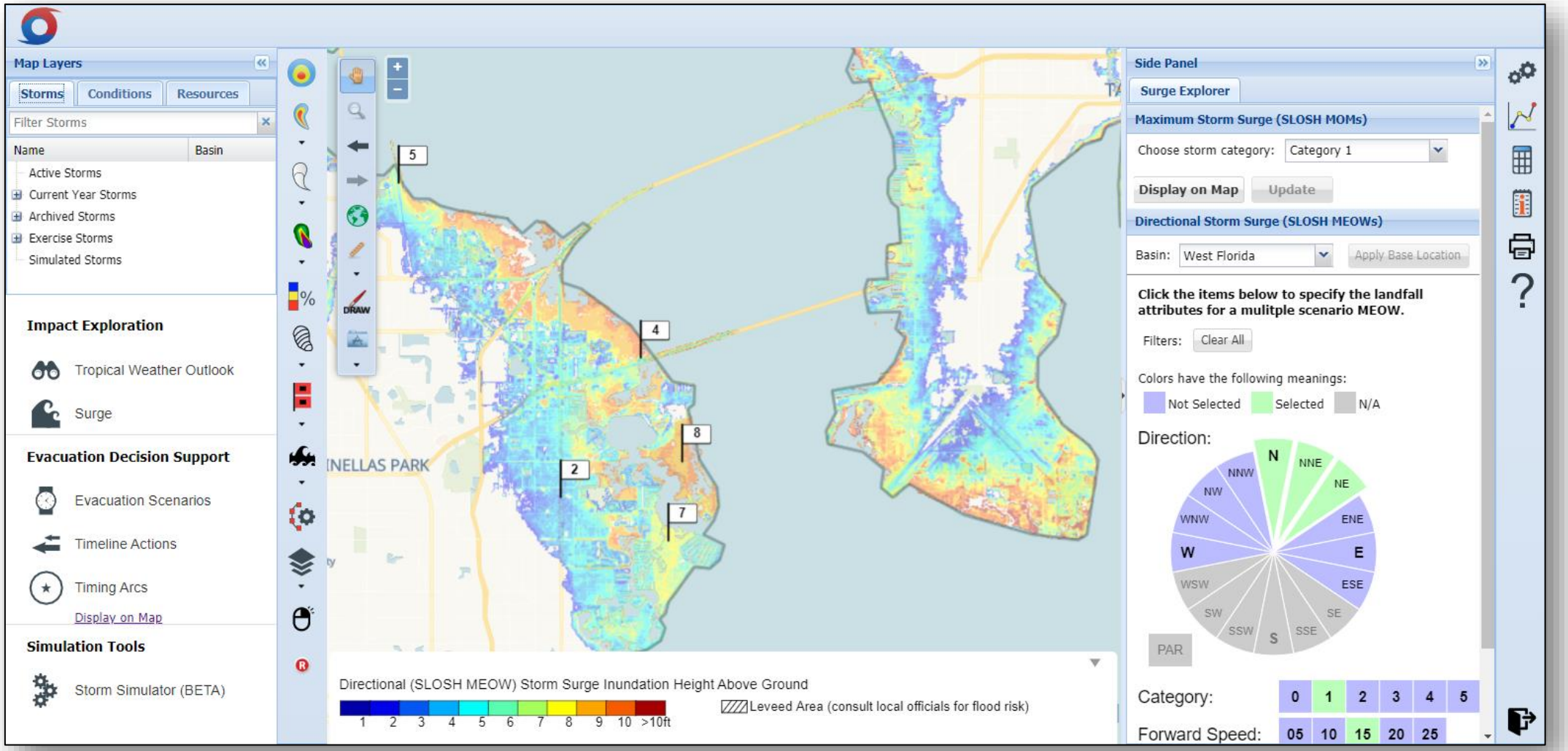
Main Reason it is Hard to Communicate Storm Surge

There are numerous reference levels (datums), which one does a person use?

How high is 5 ft of surge?

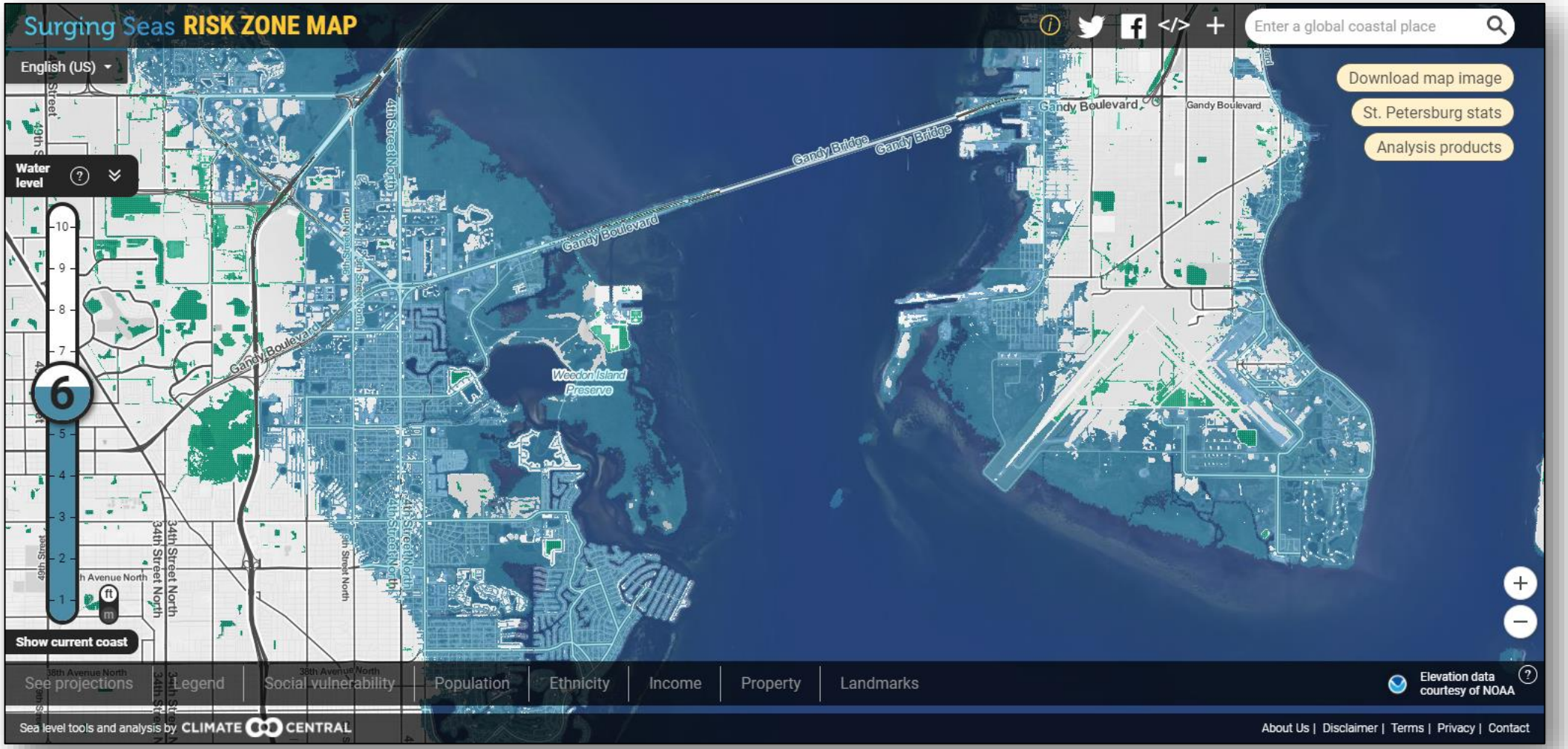


View Surge Heights on a Map - HVX



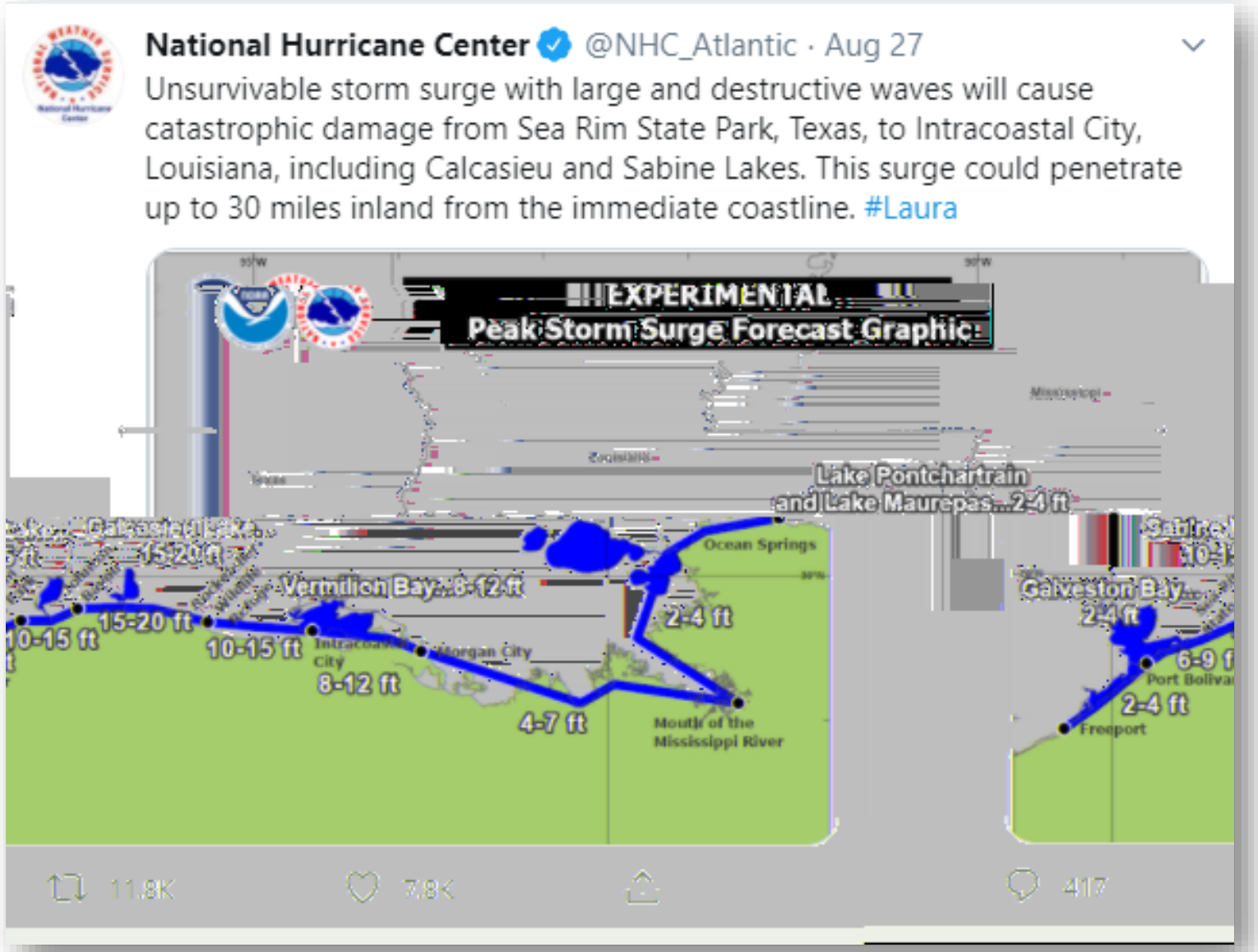
https://hvx.hurrevac.com

View Surge Height on a Map - Sea Level Rise Viewer



https://ss2.climatecentral.org

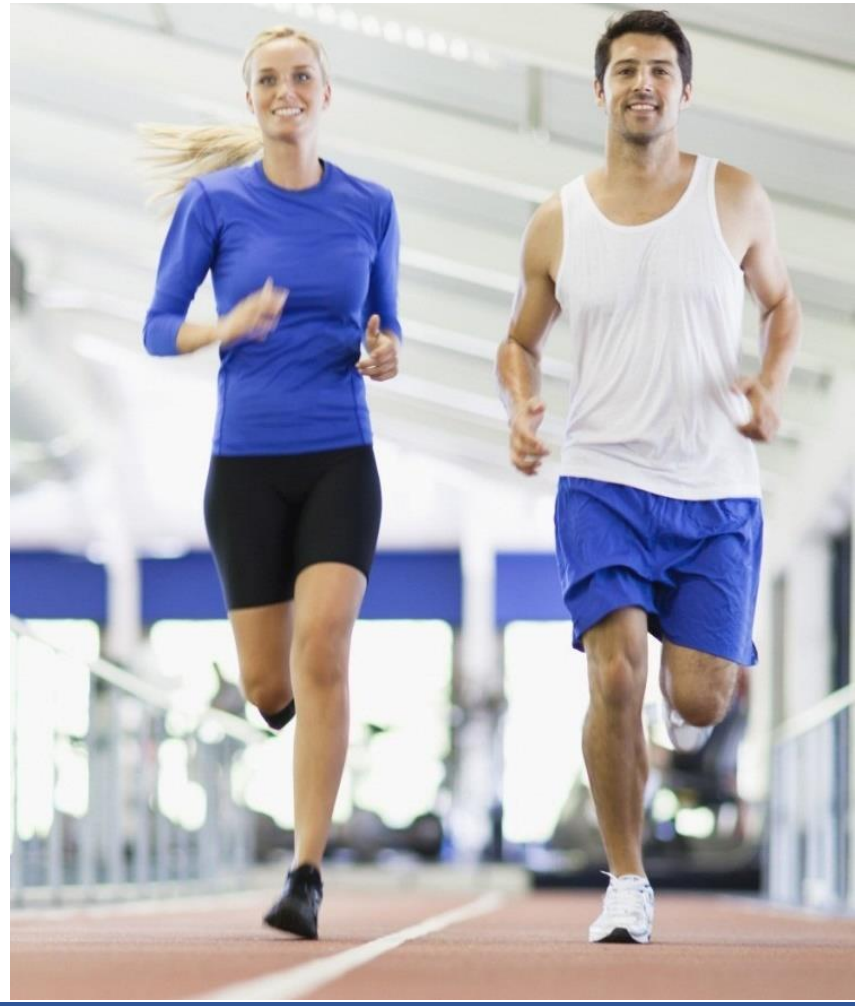
Tips for Using NHC Storm Surge Forecasts



The surge forecast displayed is what people should prepare for

This is the 1-in-10 forecast, a realistic threat of a peak surge reaching this height

weather.gov/tampa/workouts



Weather Workout – Storm Surge, River Forecasting

NWS TAMPA BAY (RUSKIN, FL)

FEBRUARY 23, 2021

HTTPS://WEATHER.GOV/TAMPA/WORKOUTS