USGS's Response to Hurricanes Florence and Michael

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Several USGS online products available to assess water levels before, during, and after a hurricane

- USGS WaterWatch: https://waterwatch.usgs.gov/
- USGS Total Water Level and Coastal Change Forecast Viewer: https://coastal.er.usgs.gov/hurricanes/research/twlviewer/
- USGS Coastal Change Hazards Portal: https://marine.usgs.gov/coastalchangehazardsportal/
- USGS Flood Event Viewer: https://stn.wim.usgs.gov/fev/
- USGS Event Support Map (hurricane specific)
- Water Footprint Data Visualization (hurricane specific)

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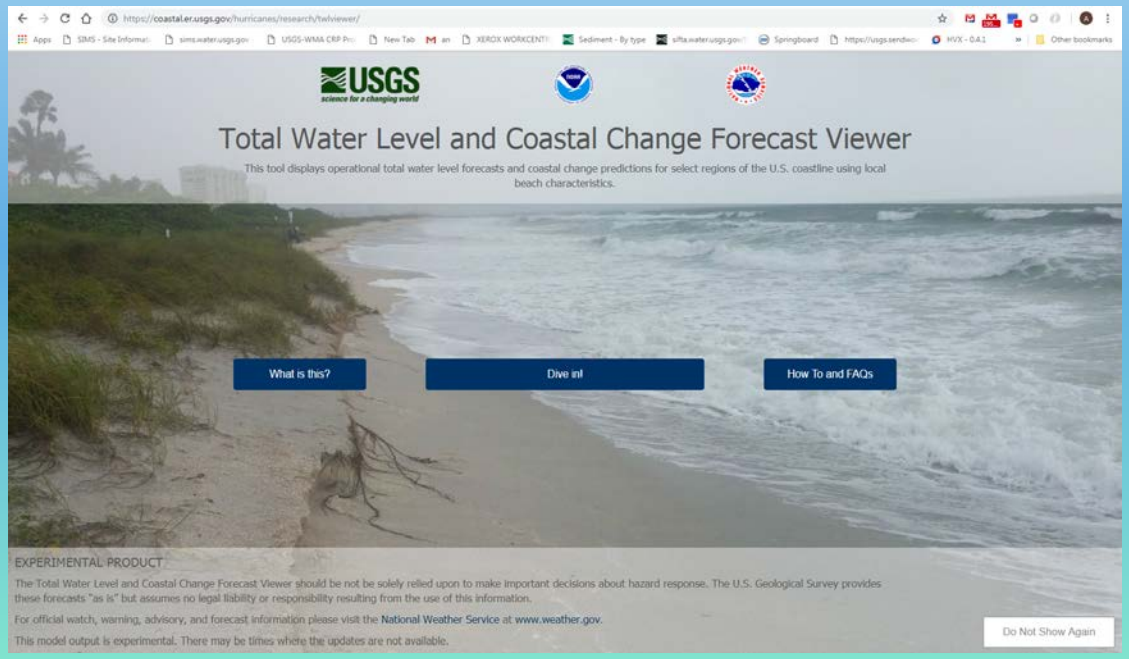
USGS Total Water Level and Coastal Change Forecast Viewer: https://coastal.er.usgs.gov/hurricanes/research/twlviewer/



- This tool displays operational total water level forecasts and coastal change predictions for select regions of the U.S. coastline using local beach characteristics.
- Model output is experimental. For official watch, warning, advisory, and forecast information, please visit the National Weather Service at www.weather.gov

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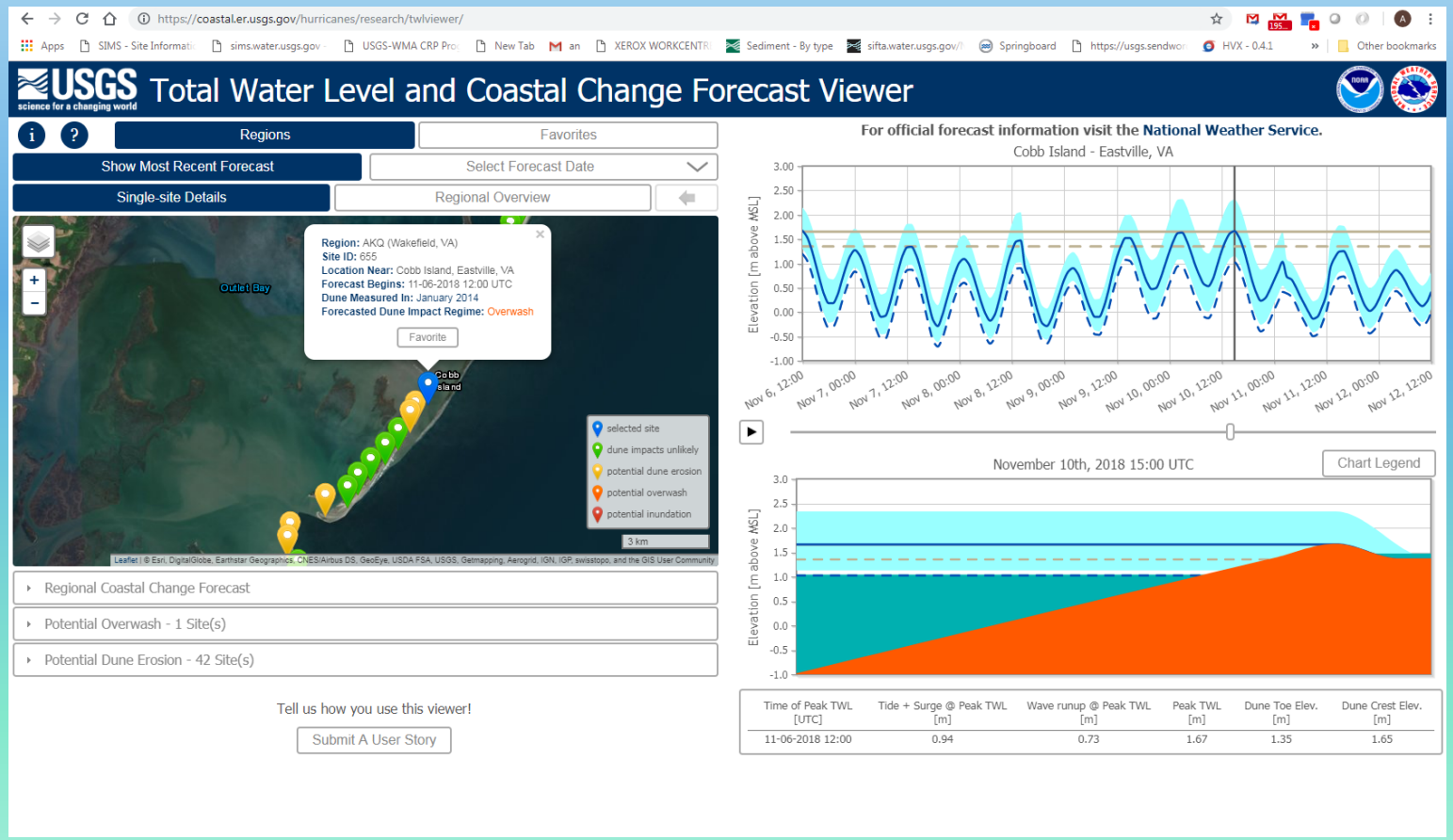

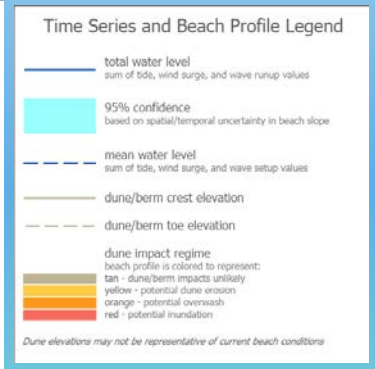

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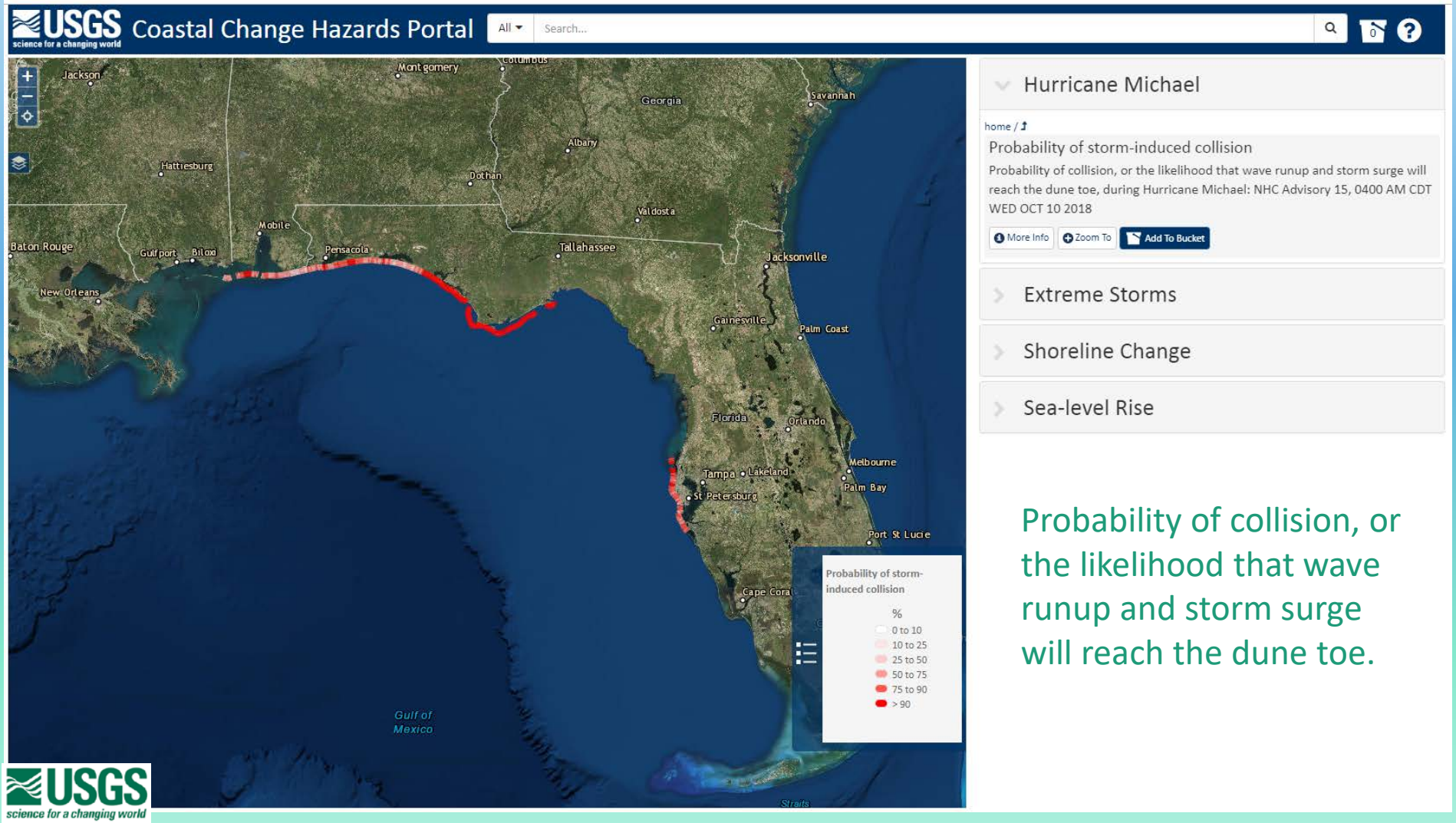
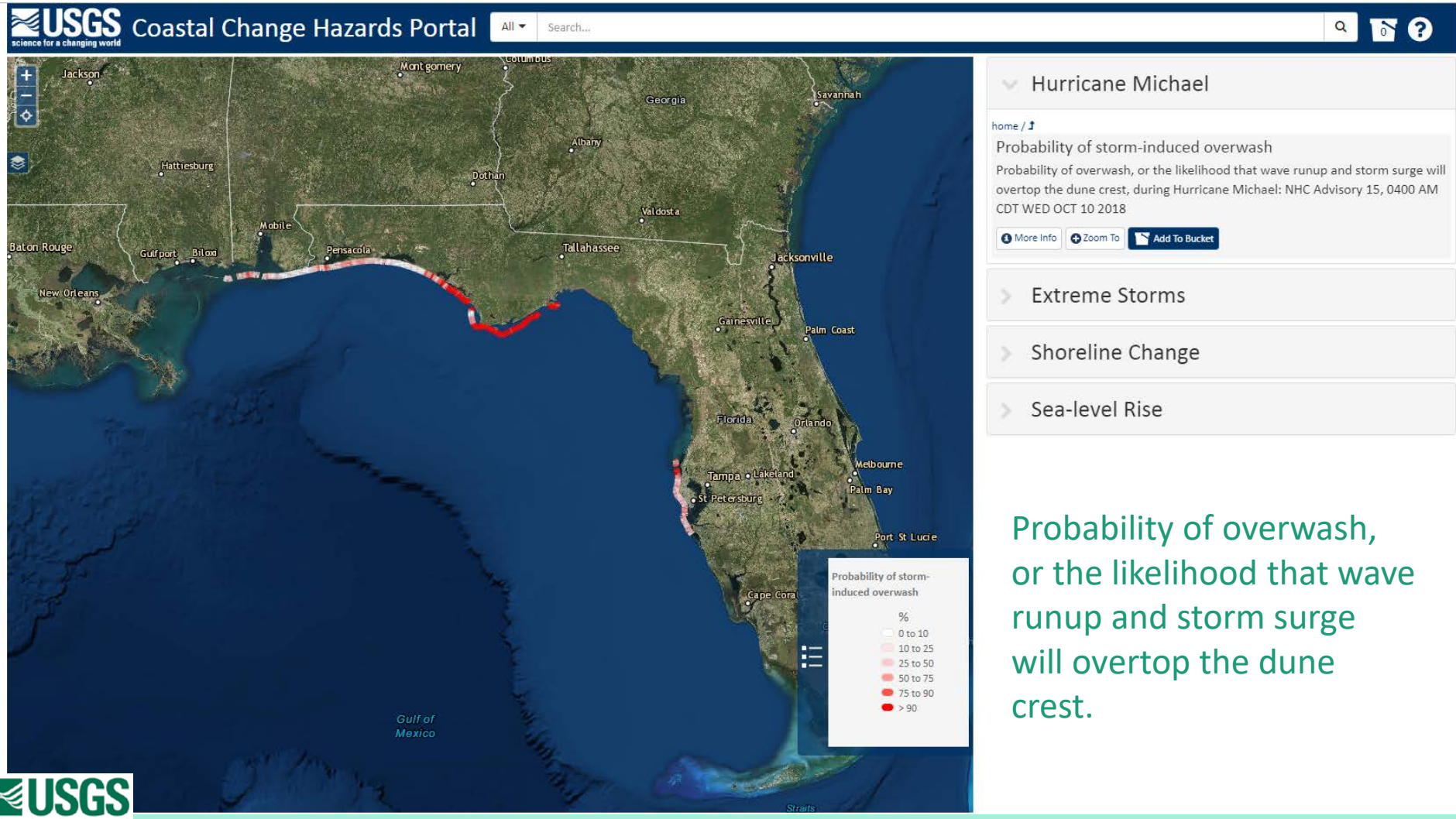
Coastal Change Hazards Portal
Probability of storm-induced collision



Probability of collision, or the likelihood that wave runup and storm surge will reach the dune toe.

Coastal Change Hazards Portal
Probability of storm-induced collision



Probability of overwash, or the likelihood that wave runup and storm surge will overtop the dune crest.

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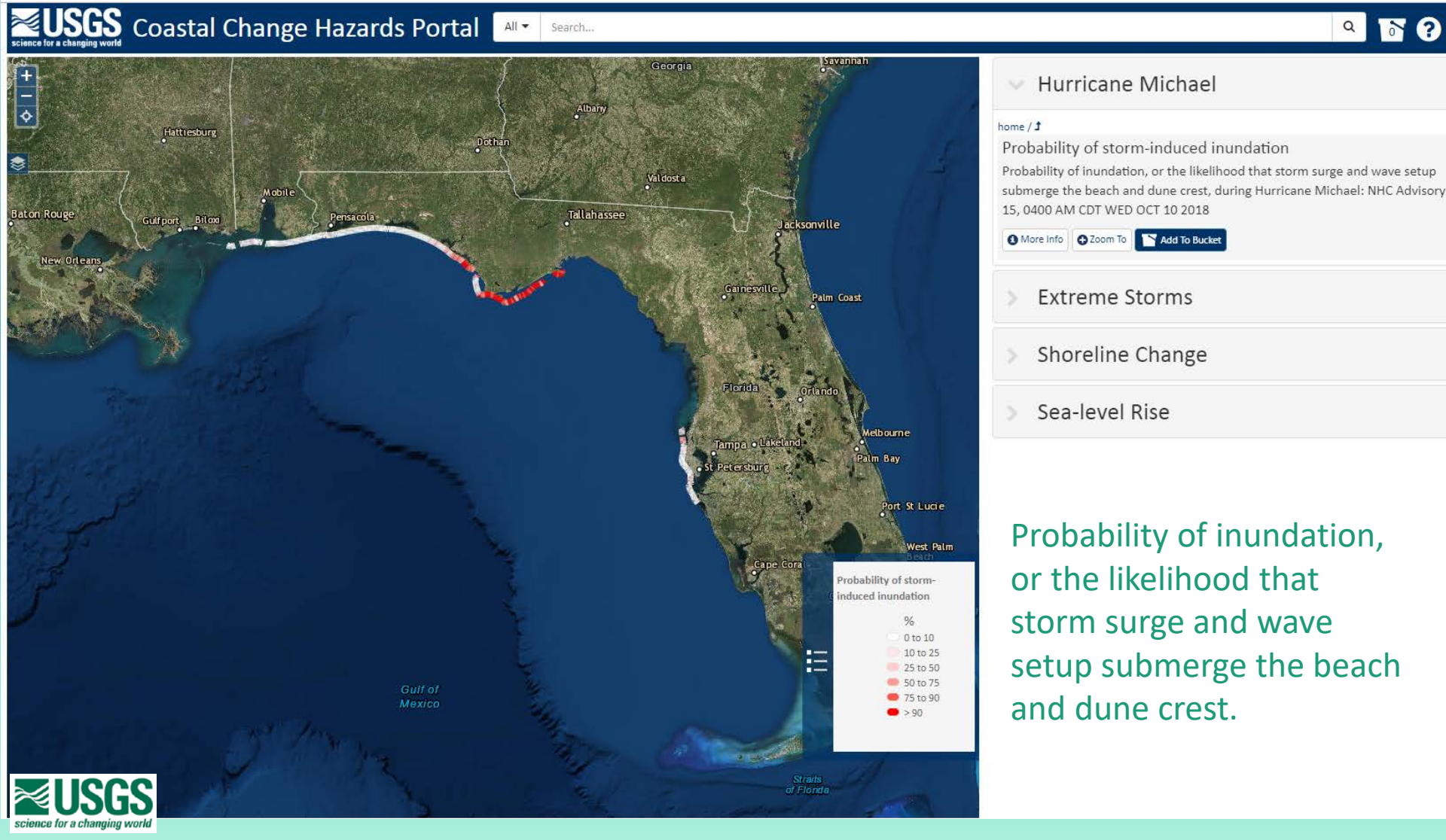
Coastal Change Hazards Portal
Probability of storm-induced inundation



Probability of inundation, or the likelihood that storm surge and wave setup submerge the beach and dune crest.

USGS storm response

- Deploy storm-tide and wave sensors to collect storm tide water-level and wave data
- Deploy Rapid Deployment Gages (RDGs) designed to temporarily measure and transmit real-time stream stage/storm-tide water-level data in an emergency situation. The speed with which these gages can be installed allows the USGS to …
  - Augment the gage networks during coastal and riverine flooding
  - Provide situational awareness and support to emergency managers
  - Replace streamgages when equipment is damaged
- Flag and survey high water marks (HWMs) to fill data gaps and develop flood inundation maps
- Repair damaged streamgages and collecting high flow measurements
- Data can be retrieved from the USGS Flood Event Viewer: https://stn.wim.usgs.gov/fev/

Highwater Marks

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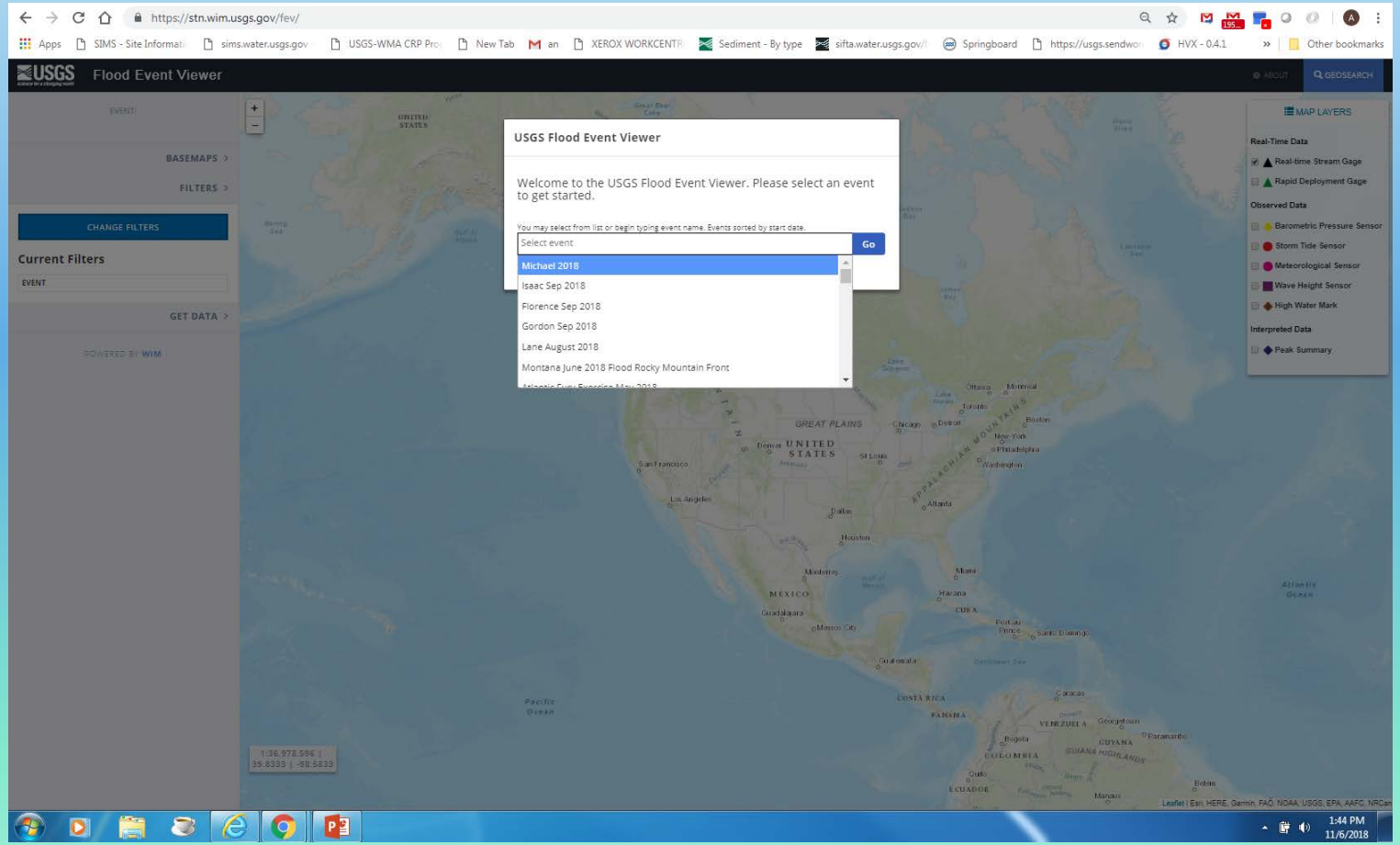
USGS Flood Event Viewer: https://stn.wim.usgs.gov/fev/



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Storm Tide Sensor
Before & After @ Mexico Beach

https://www.washingtonpost.com/national/hurricane-michael-is-looking-even-more-violent-on-closer-scrutiny/2018/11/11/313bce34-d85a-11e8-a10f-b51546b10756_story.html?utm_term=.7a40a2a0b3c7

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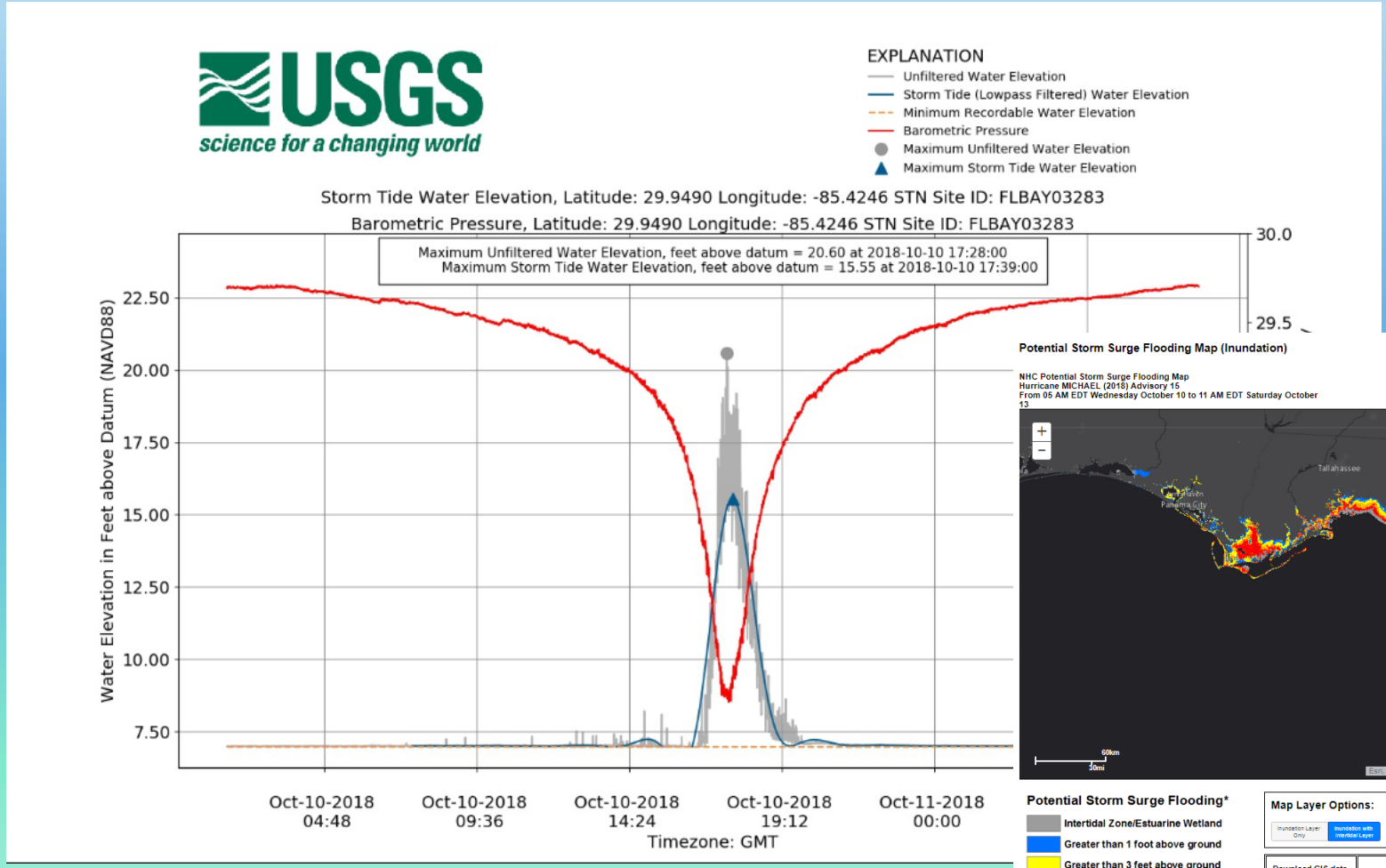
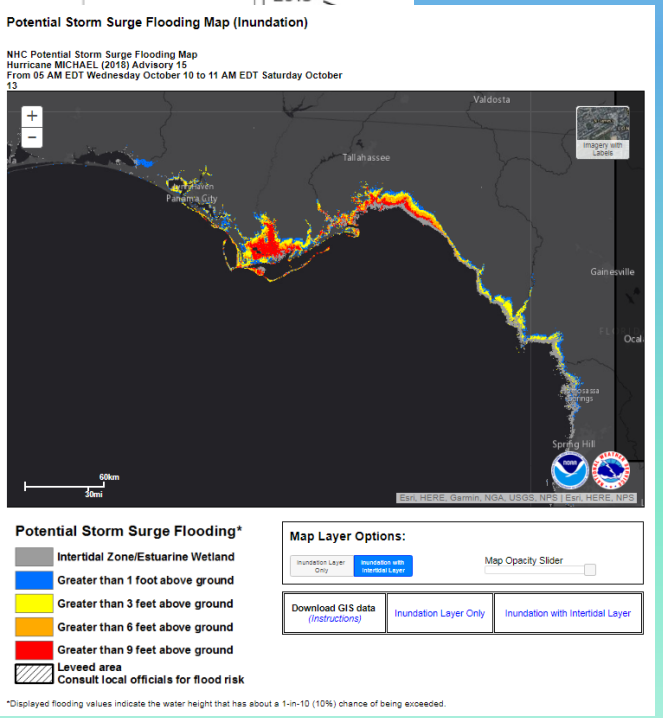
Storm Tide Sensor
Storm Tide Sensor Data





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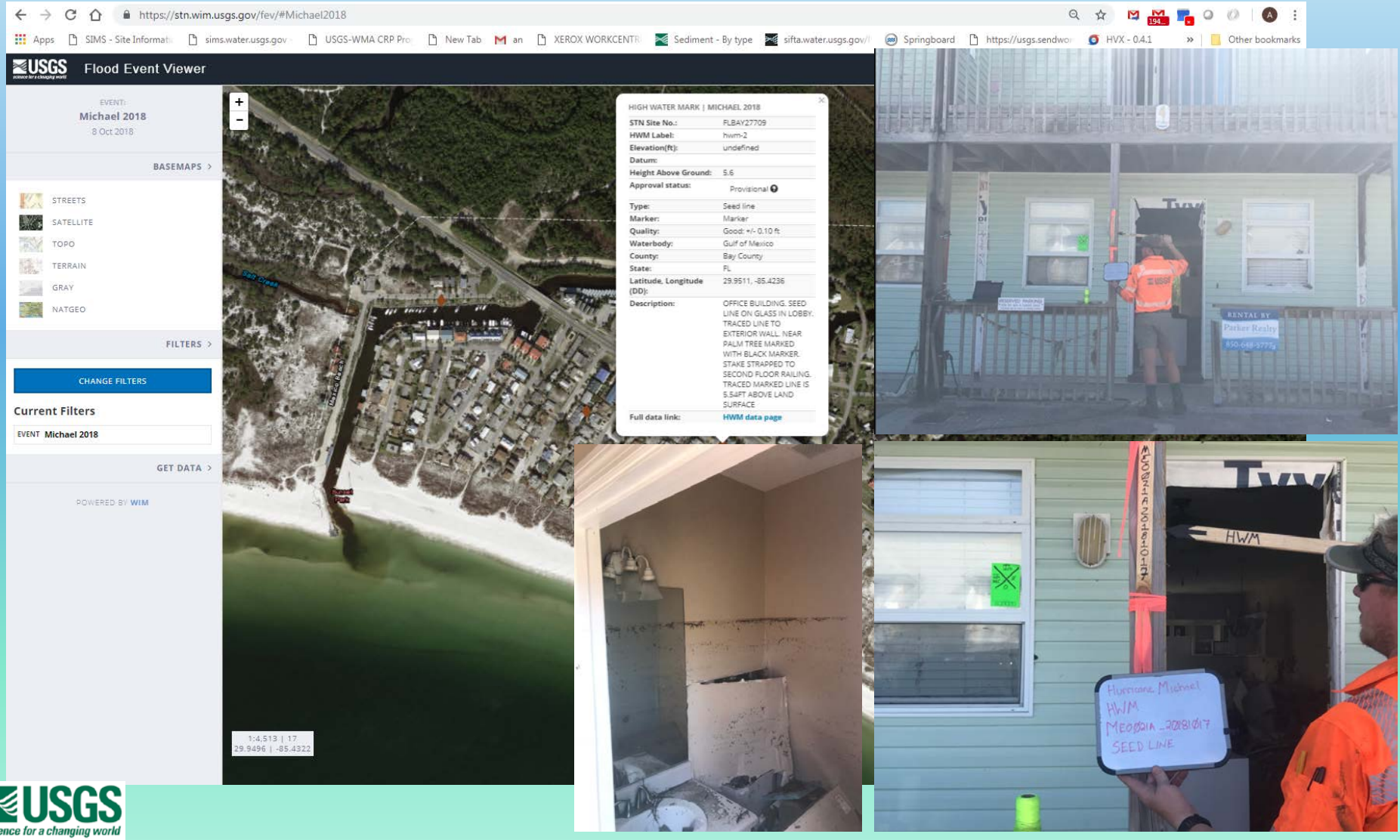
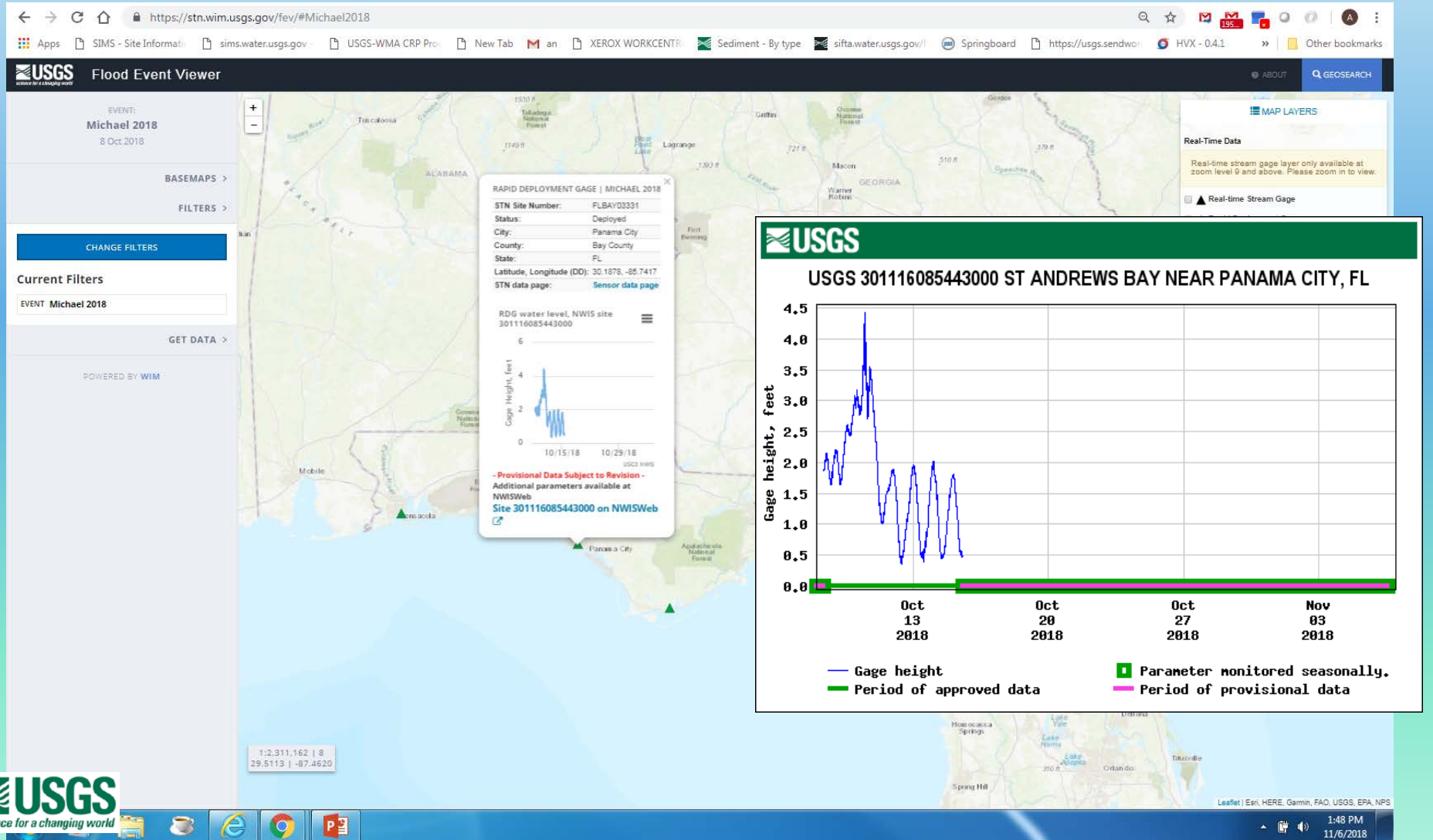
High Water Marks



Real-time streamgages – temporary (RDGs)



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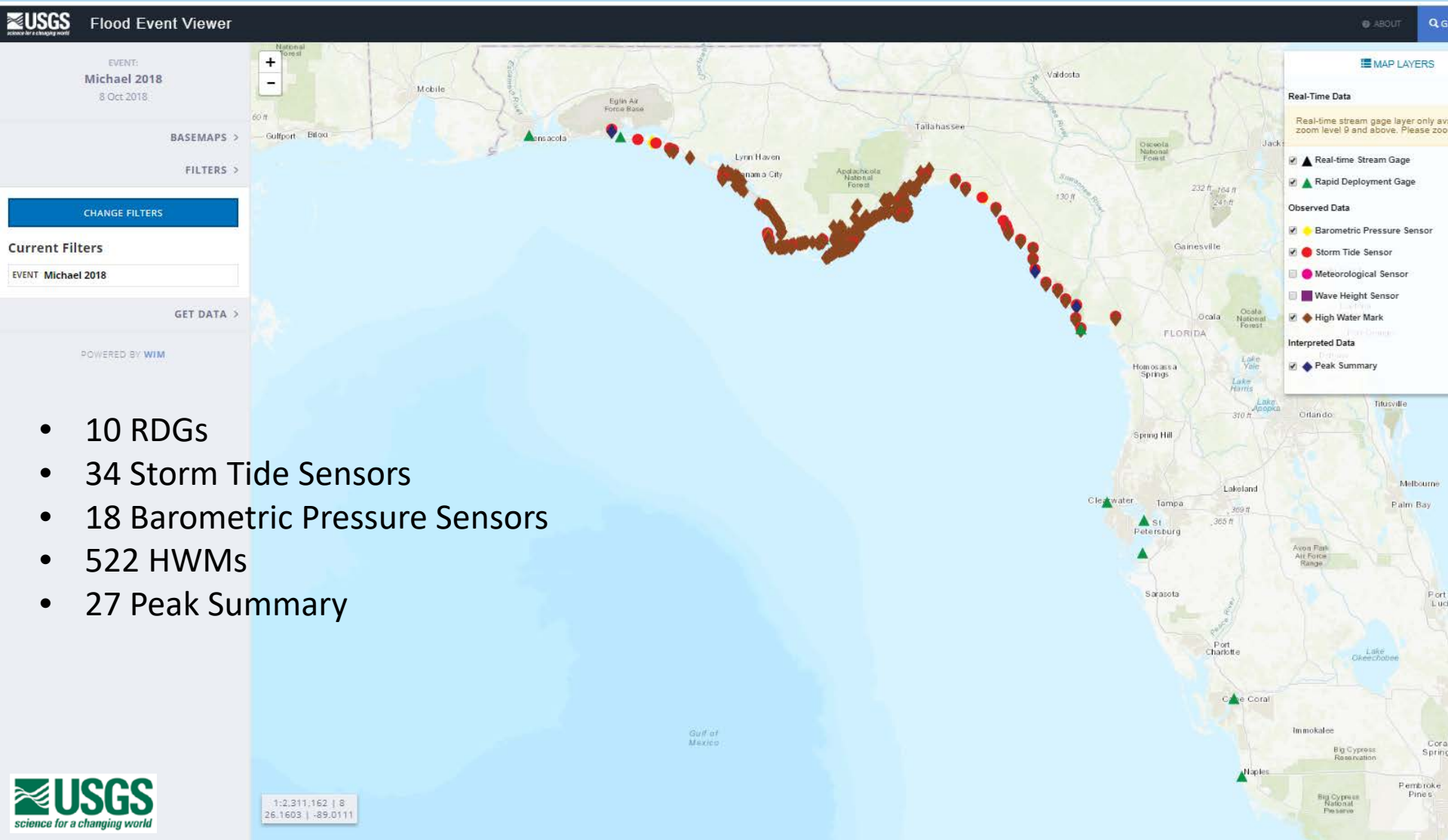
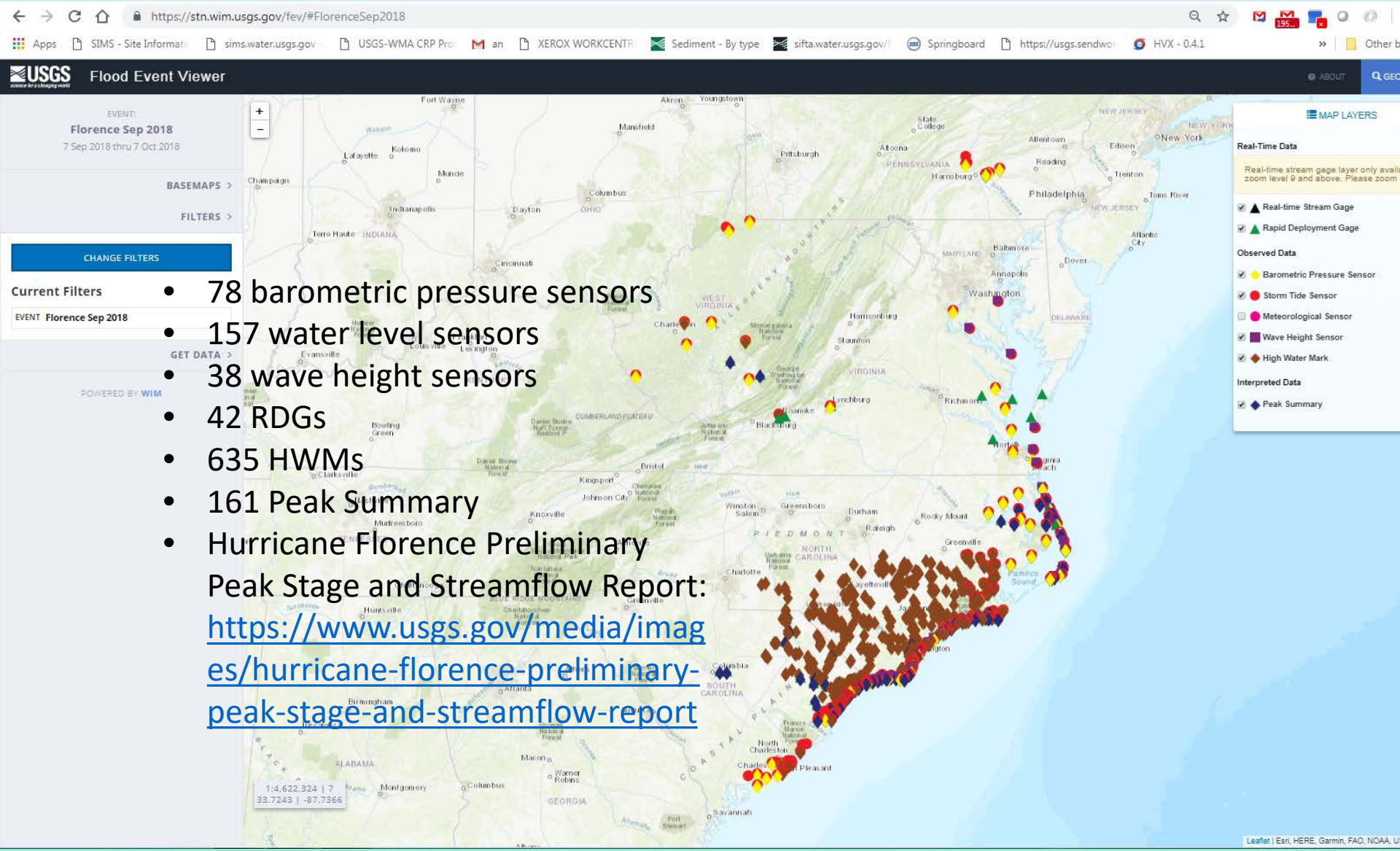
Hurricane Michael



- 10 RDGs
- 34 Storm Tide Sensors
- 18 Barometric Pressure Sensors
- 522 HWMs
- 27 Peak Summary

Hurricane Florence



- 78 barometric pressure sensors
- 157 water level sensors
- 38 wave height sensors
- 42 RDGs
- 635 HWMs
- 161 Peak Summary
- Hurricane Florence Preliminary Peak Stage and Streamflow Report: https://www.usgs.gov/media/images/hurricane-florence-preliminary-peak-stage-and-streamflow-report

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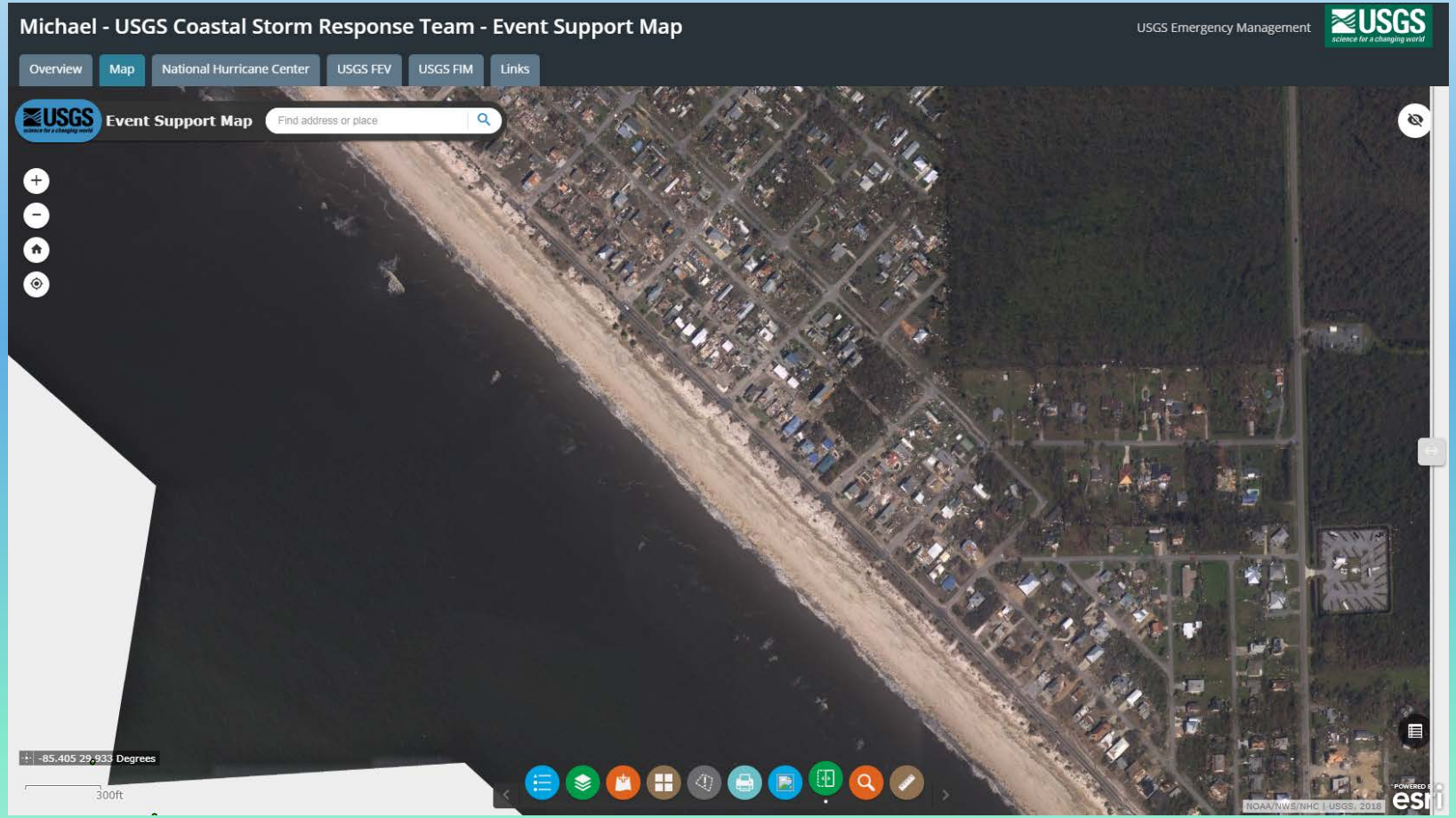
http://www.msn.com/en-us/weather/topstories/hurricane-florence-set-at-least-28-flood-records-according-to-new-usgs-report/ar-BBPFVL8?li=BBnb7Kz&ocid=iehp

USGS Event Support Map:

A multi-layered map that includes forecasts, storm tracks, topographic maps, and more in one place. Hurricane Specific site.



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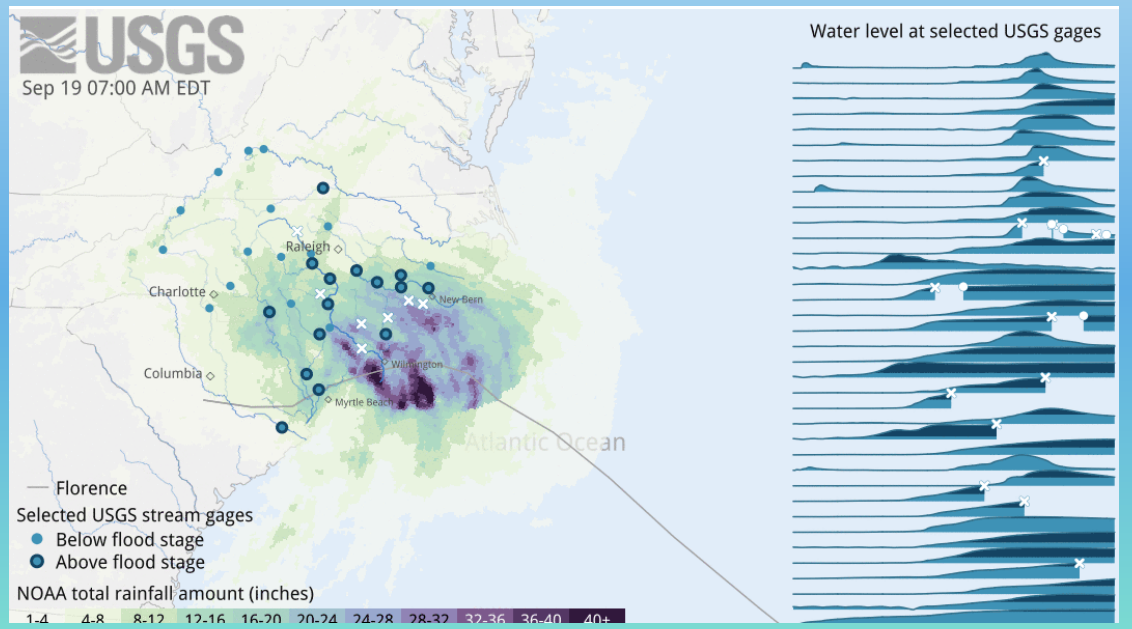
Water Footprint Data Visualization

Watch Florence move through the Carolinas in this data visualization and see USGS streamgage measurements spike as the storm's extreme rainfall leads to intense flooding. USGS streamgages provide critical information during storms to flood forecasters and emergency managers as they make decisions that contributes to protecting lives and property. Understanding river levels and locations of flooding can make a huge difference in these dangerous storms. The water footprint visualization shows patterns of precipitation and river discharge of 18 USGS streamgages greatly impacted by Florence.



https://www.usgs.gov/media/images/hurricane-florence-water-footprint-data-visualization

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USGS Pre-defined Sites for Storm Tide Sensor Deployment

- Pre-identified sites
- Faster sensor deployment
- Some have pre-installed/pre-surveyed brackets

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Questions?

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