



Extreme Precipitation and Flooding in the Southern Appalachian Mountains Associated with Tropical Storm Alberto

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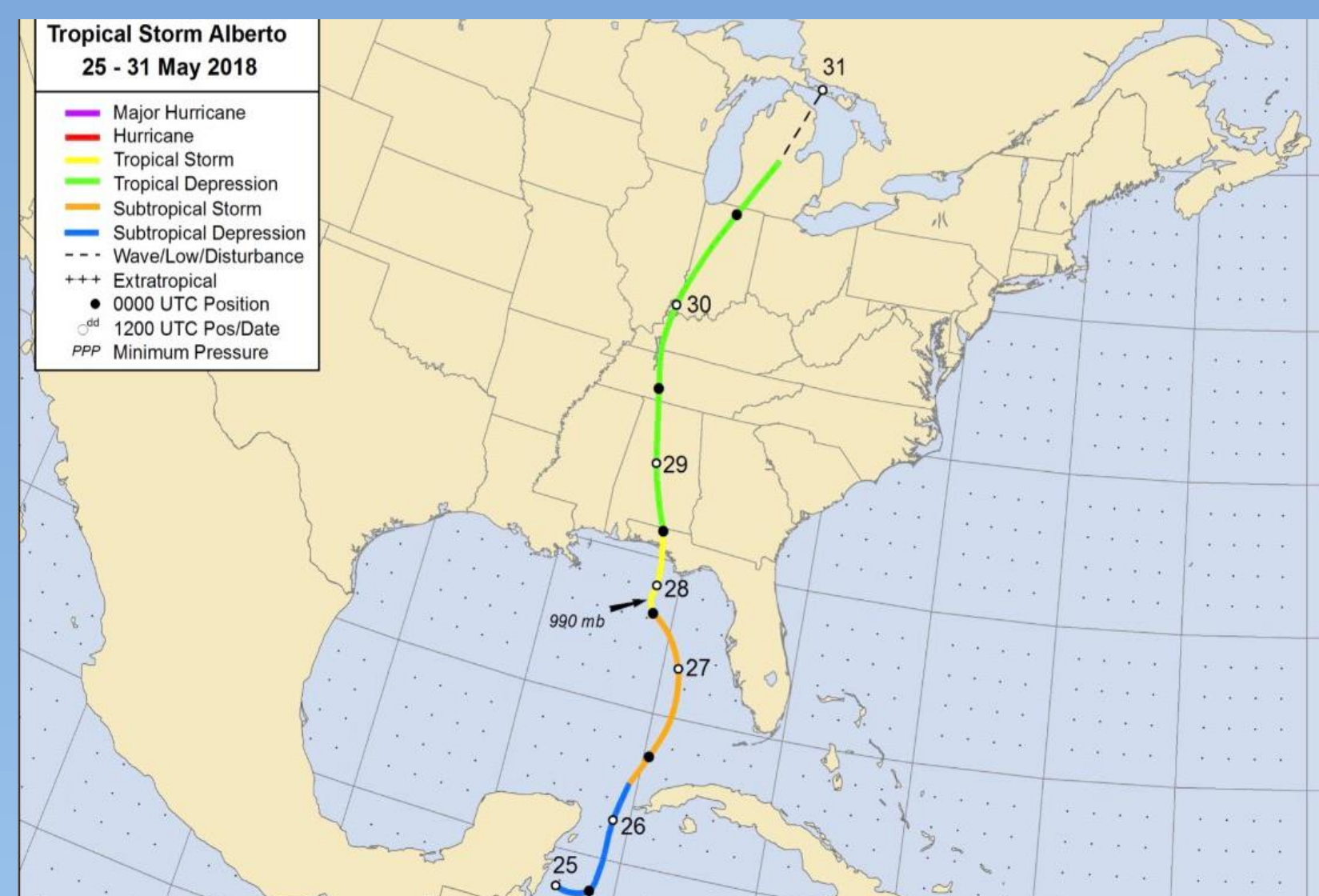


THE UNIVERSITY
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Tropical Storm Alberto

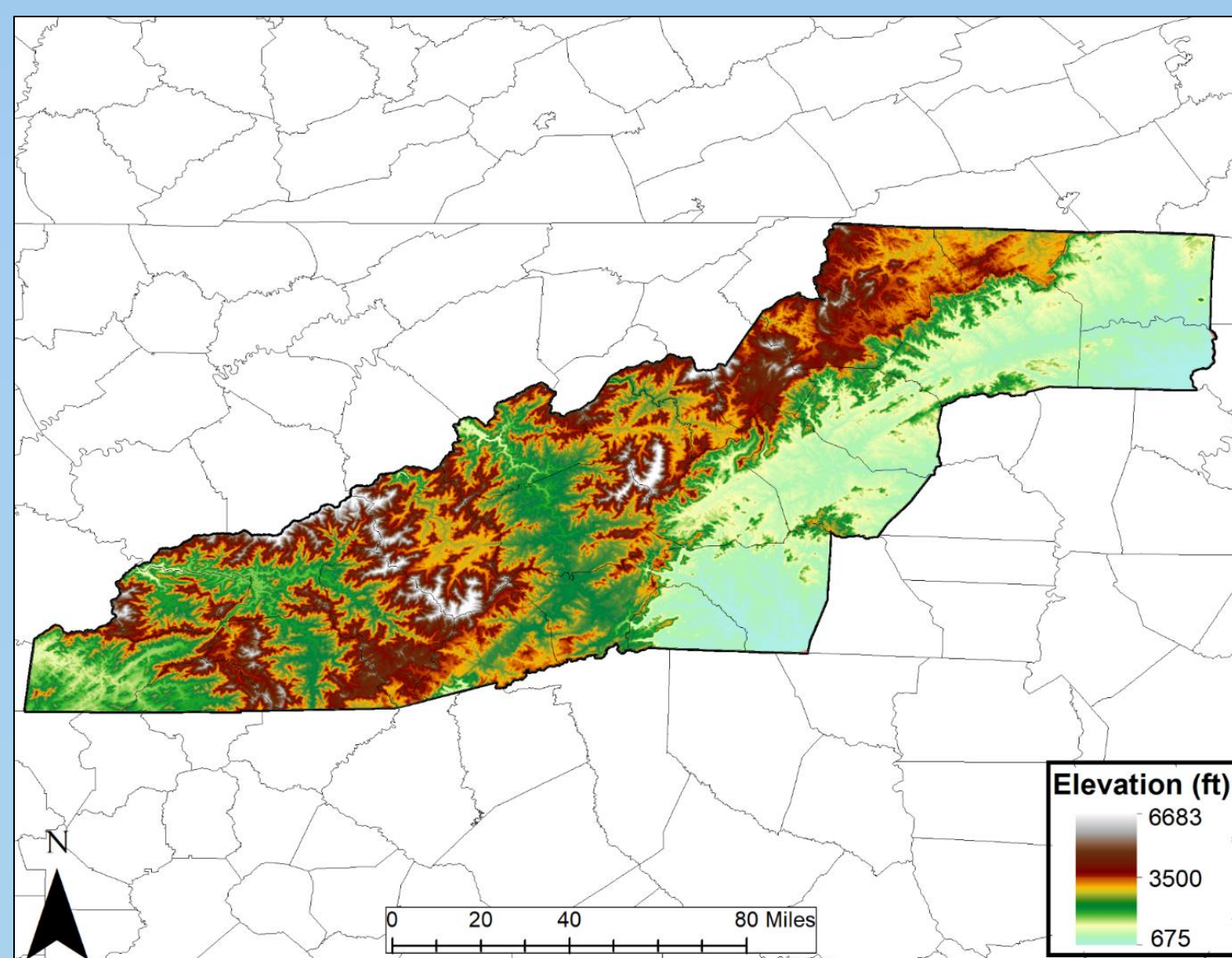


Satellite imagery as Tropical Storm Alberto
nears landfall in Florida

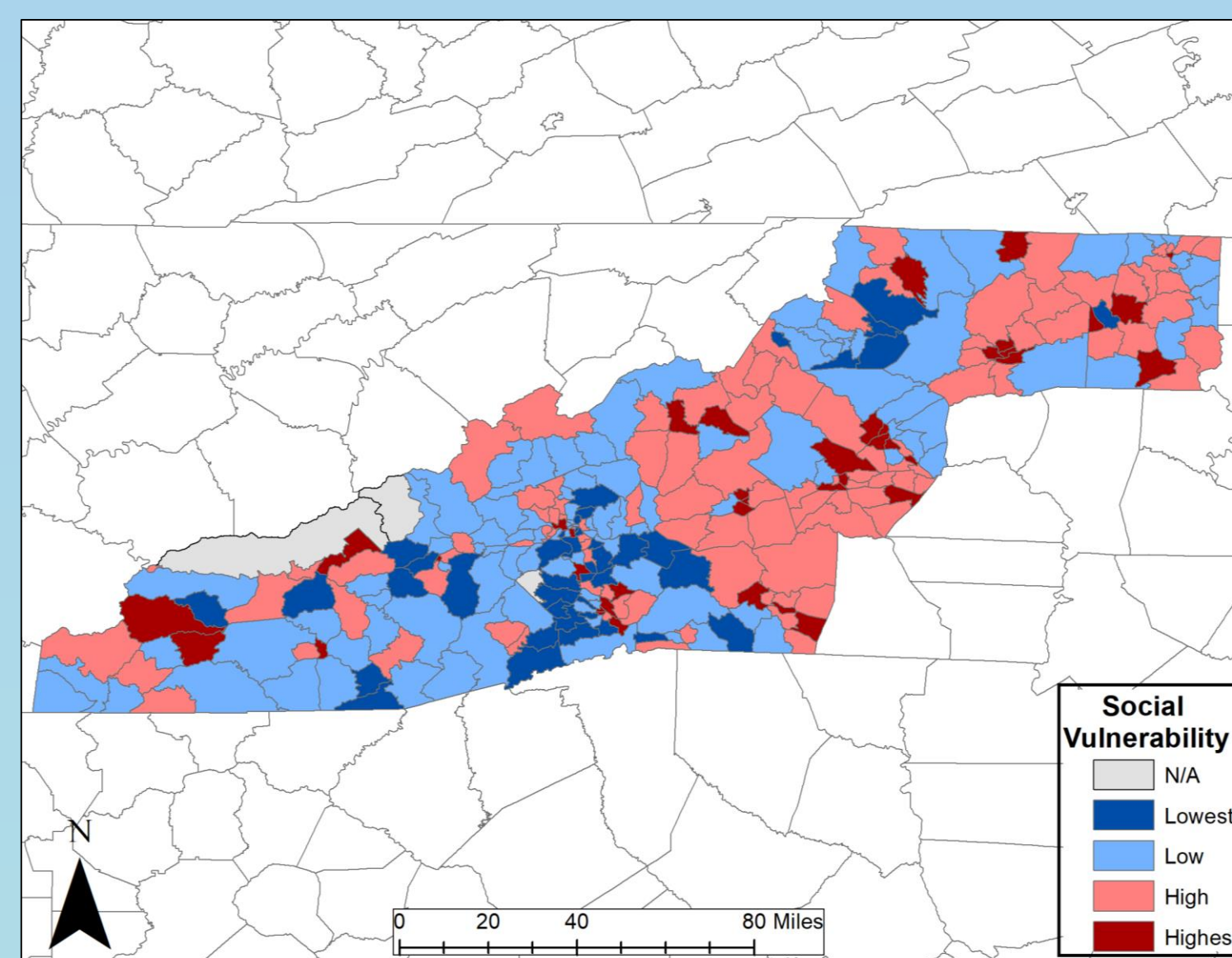


Final Track of Tropical Storm Alberto by the
National Hurricane Center

Southern Appalachian Mountains

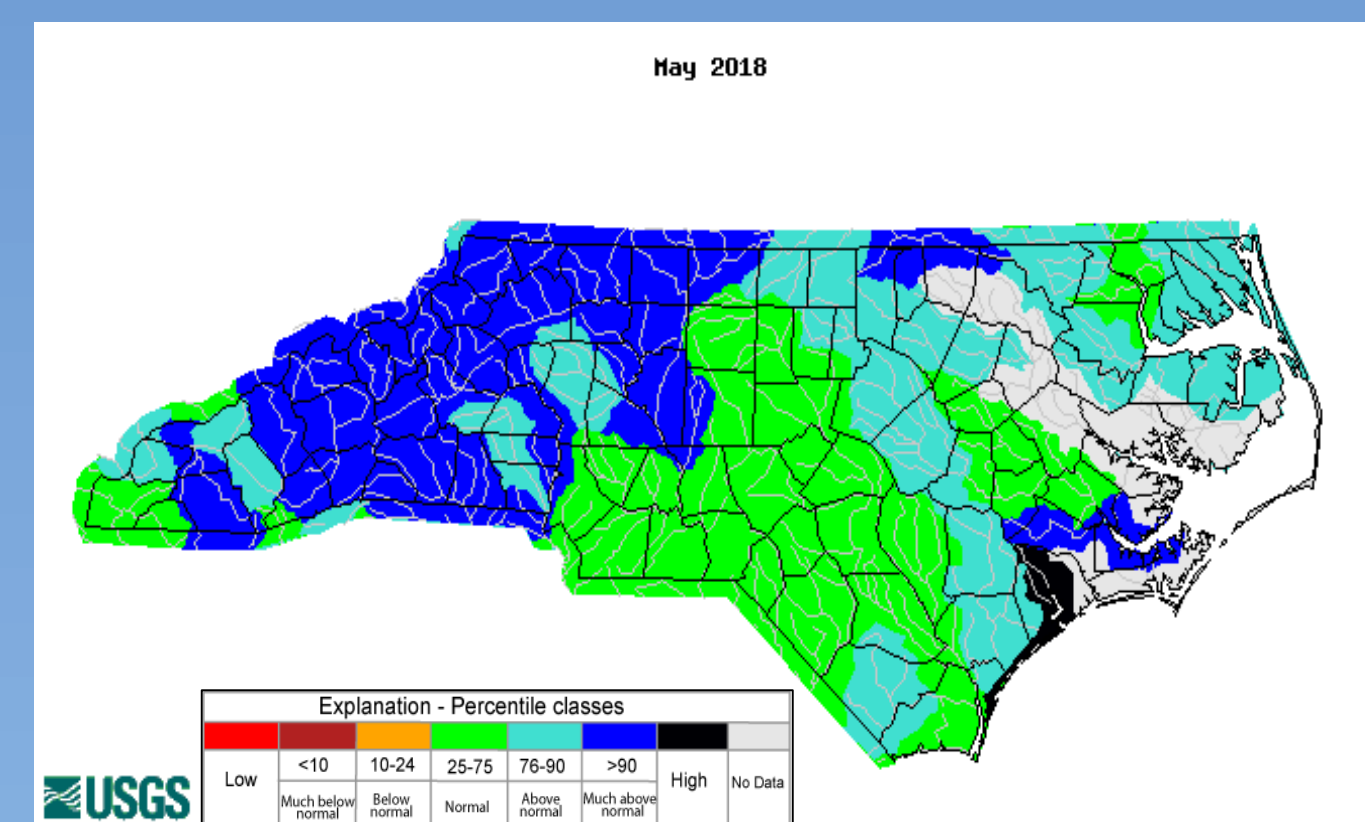
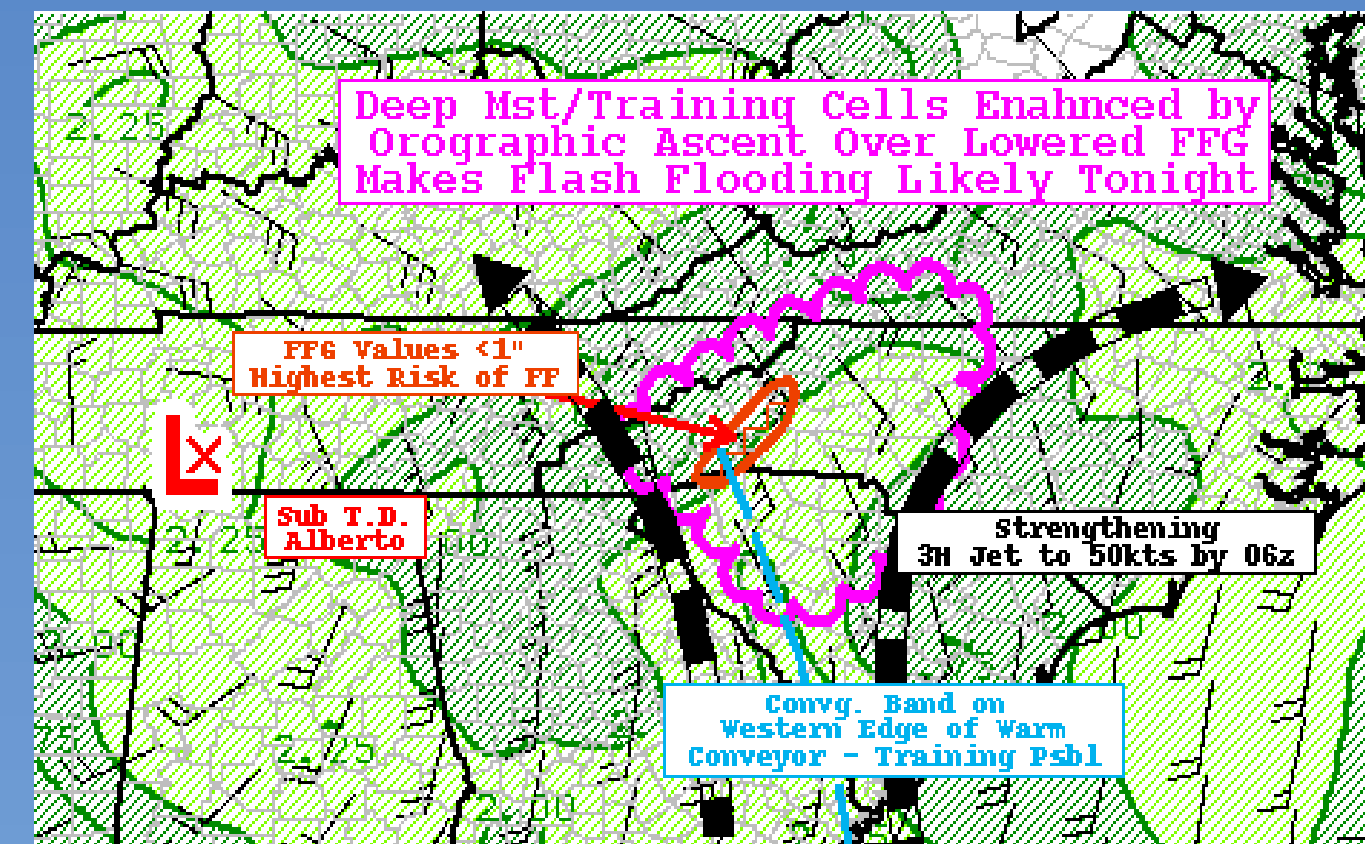


Topography of the southern Appalachian
Mountains in western North Carolina



Social vulnerability of western North Carolina
(CDC: SVI 2016)

Ingredients for Heavy Precipitation and Flash Flooding



Tropical Moisture-Infused Orographic Lifting

The westward track of Alberto produced southerly upsloping winds & orographic lift along the Blue Ridge Escarpment. Bands of heavy rain stalled out over local communities and resulted in 5"+ in mere hours.



Above-Average Spring Precipitation

Heavy rain in April and early May provided well-above normal streamflow in parts of the mountains. By the time Alberto arrived, many rural communities in Polk County were still recovering from deadly flooding and debris flows that struck earlier that same month.



Flash Flooding

Heavy rain during the day on May 29th continued well into the night with rates often surpassing 1"hr. Roads, bridges, and first responders were washed away, Lake Tahoma Dam threatened collapse, and thousands were forced to evacuate.

Rural, Vulnerable Communities Heavily Impacted

Old Fort, NC



Boone, NC



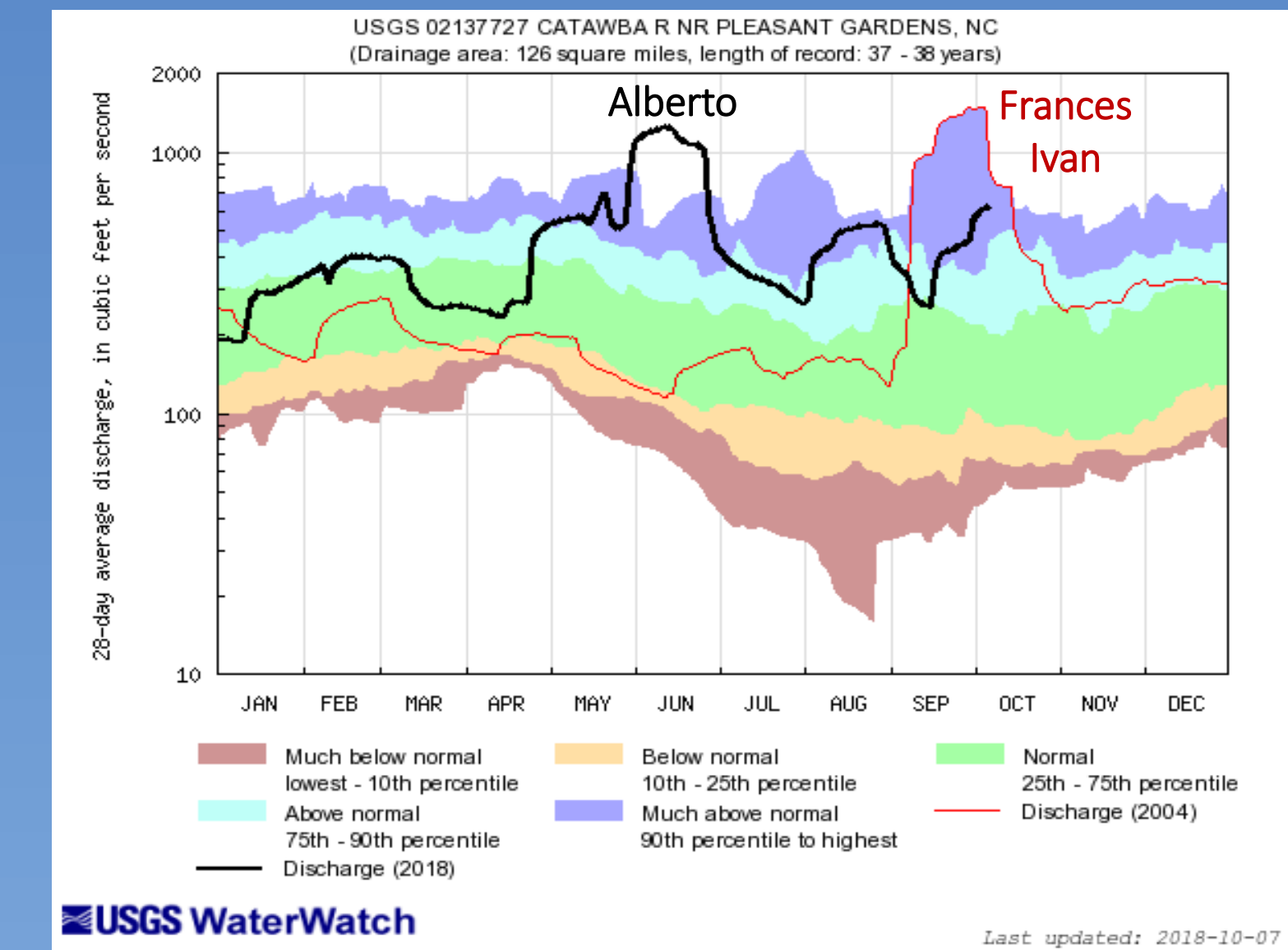
Saluda, NC



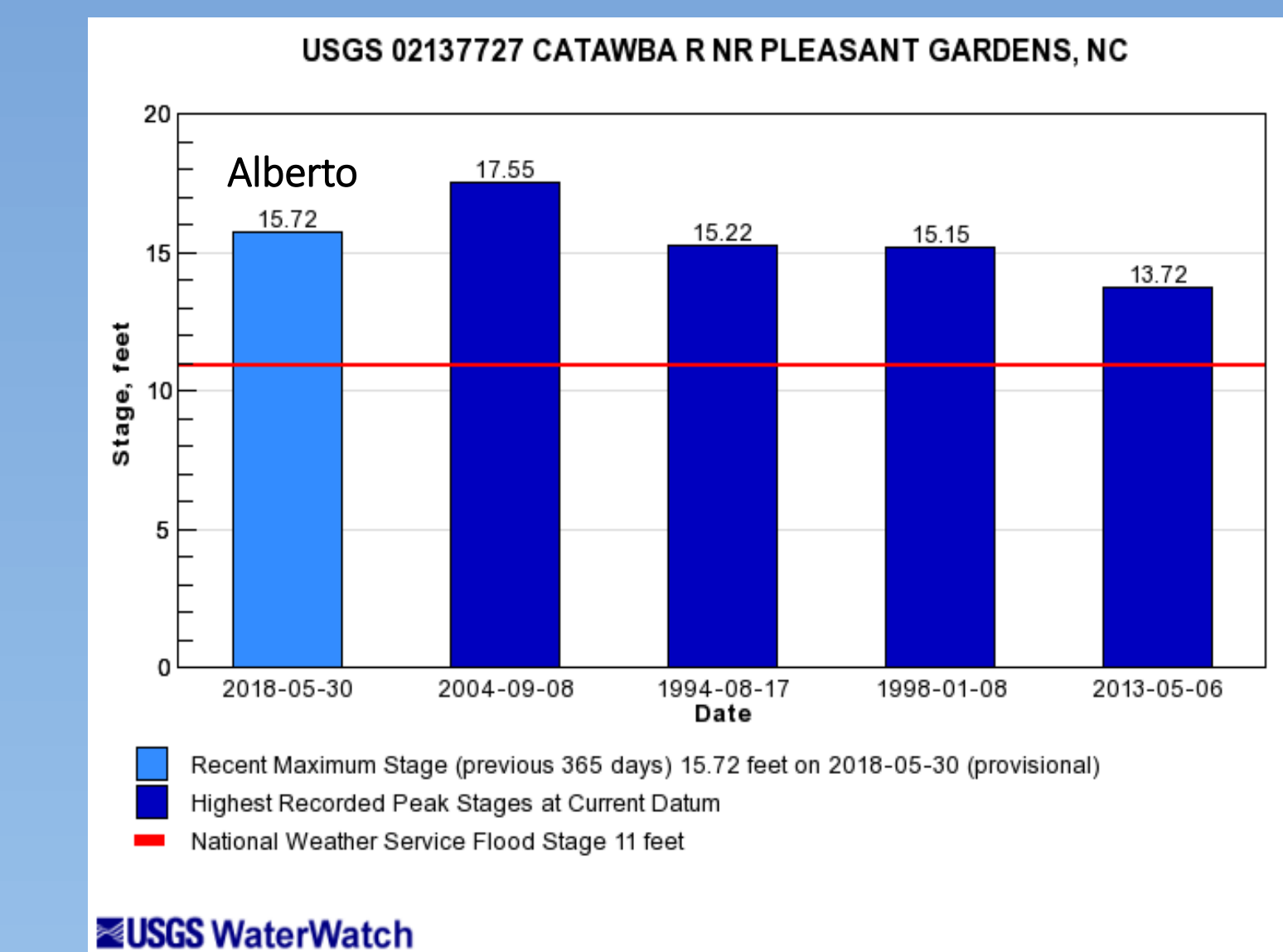
"I thought, 'My life is about over, so I need to call my wife.'
'The storms are worse. The rain is worse. The heat is worse.'
(The Washington Post)

Historic Flooding and Damage

- Equaled or surpassed the devastation caused by Hurricanes Frances and Ivan in September 2004
- Discharge from the Catawba River in McDowell County was unprecedented for any Spring rain event
- Discharge remained above normal for months following event



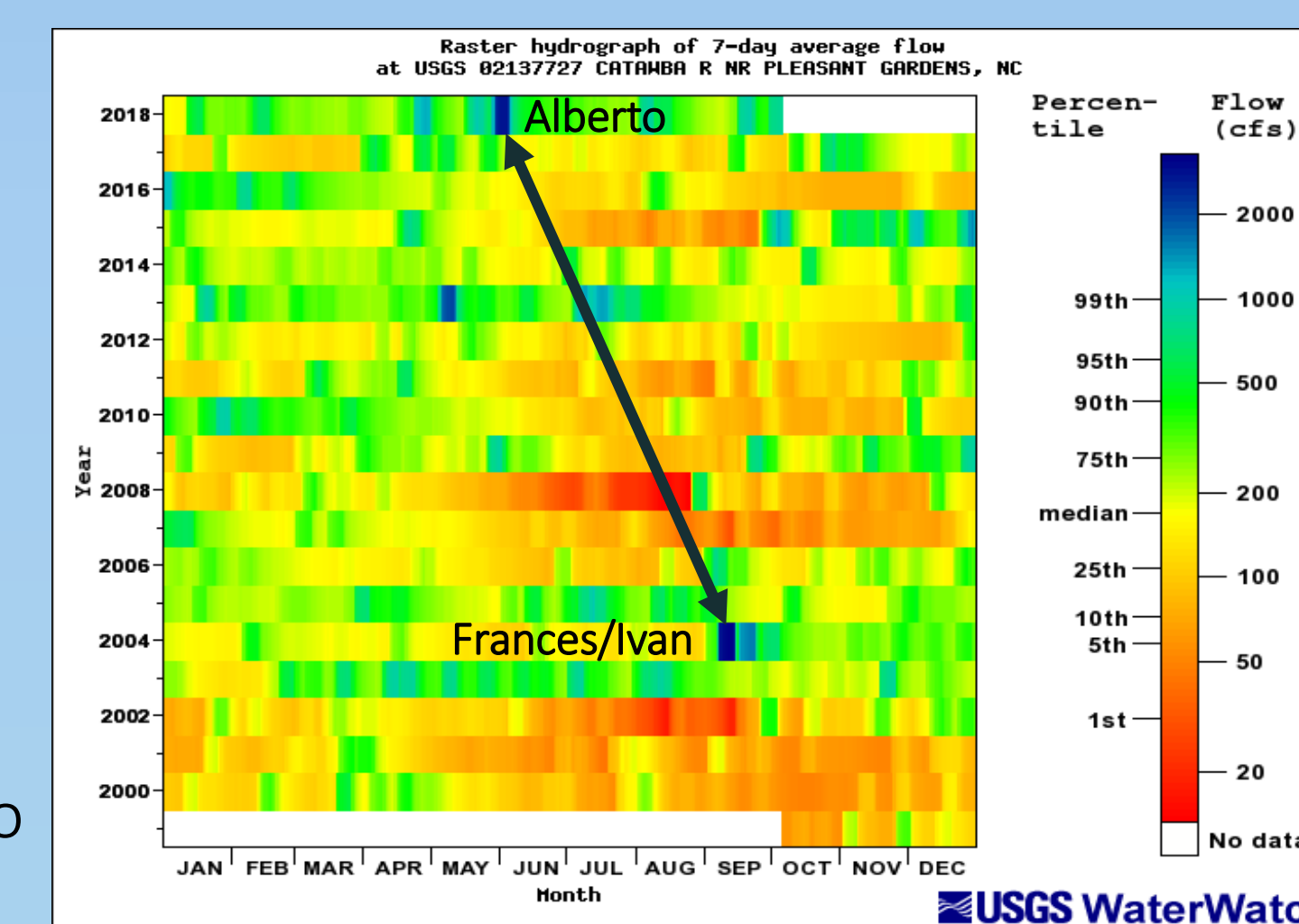
Alberto and Frances/Ivan exceeded 95th percentile average
weekly discharge in the Catawba River



Historic crests of the Catawba River in Pleasant Gardens,
NC. Alberto flooding ranks 2nd on record for this gauge

"Separate and Distinct Events"

- FEMA denied a request for a disaster declaration as the "severity and magnitude" of the damage did not go beyond the capabilities of the State
- Many towns delayed repairs so as to not jeopardize funding opportunities, only to be denied
- Smaller communities have struggled to recover following impacts from Florence and Michael

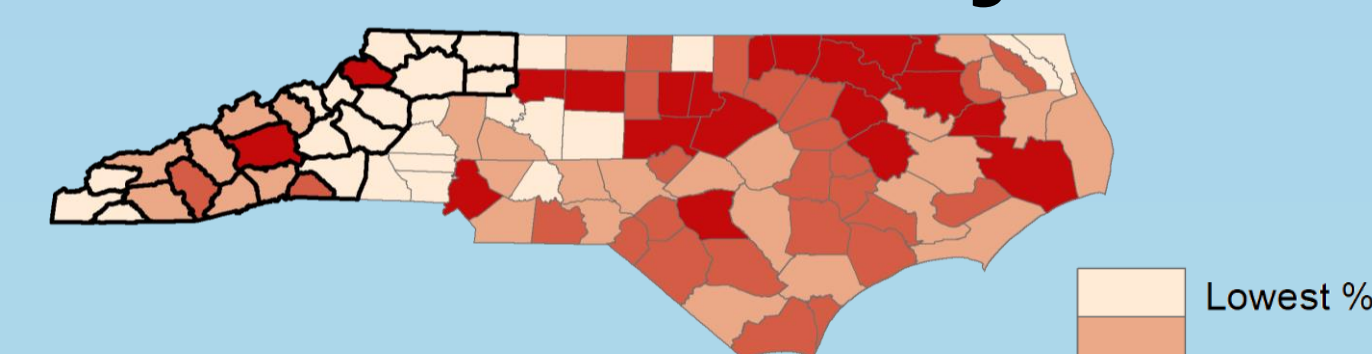


Average weekly flow of the Catawba River. Alberto
and Frances/Ivan exceeded 95th percentile flow events

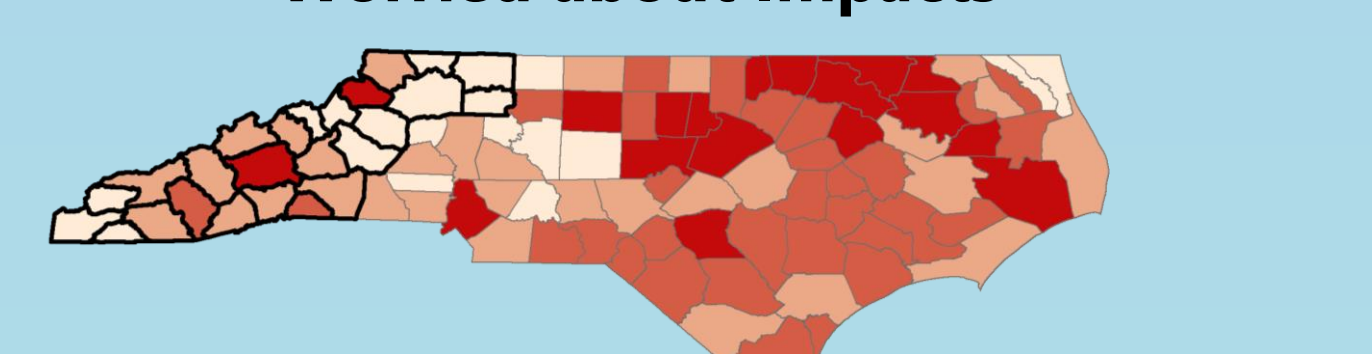
Need for Future Research

- How are rural and vulnerable communities responding to extreme events?
- How do impacts compare with Florence and Michael?
- What linkages can be made between personal experience with disaster and climate change skepticism?

Believe in Climate Change



Worried about Impacts



Compared to the rest of the state, WNC is more
skeptical and less concerned about climate change.
(Yale Program on Climate Change Communication)