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## **Horry County Supplemental Flood Zone Metadata**

### **Purpose & Goals**

This Supplemental Flood Zone (SFZ) was created by Western Carolina University at the request of Horry County. This SFZ methodology goes beyond FEMA's probability-based maps (e.g., percent-annual chance), creating hazard zones based on recorded, historic flood exposure. The resulting data could be used for informational or academic purposes, or to reduce the vulnerability of future development through appropriate regulations and policy.

The primary objectives of this mapping exercise were to utilize field-collected, post-storm data (high water marks) of flood elevations from Hurricane Florence within Horry County to: 1) delineate a SFZ independent of the FEMA SFHA, which approximates the actual extent of flooding during Florence (the storm of record); and 2) create subzones (within the SFZ), each with an adjusted Base Flood Elevation (BFE) that is based on the flood elevations recorded from Florence.

This metadata was created on 10/8/2020, and may have since been updated. See this link for updates: [http://shoreline2.wcu.edu/Katie/HorrySFZ\\_Metadata.pdf](http://shoreline2.wcu.edu/Katie/HorrySFZ_Metadata.pdf)

### **Data Utilized & Consulted**

- USGS Florence flood elevation data (sensor, high water mark, and peak summary) - <https://stn.wim.usgs.gov/FEV/#FlorenceSep2018>. The majority of the flood elevation data used in this study are from high water marks, which are defined as post-flood evidence that marks the highest elevation of floodwaters (e.g., seed, mud, or debris lines stranded as water recedes).
- Florence building flood damage data— from Horry County. Removed damage points with 0% damage. Was a rapid assessment of damage percent for buildings in the county, commonly containing an estimate of water height within the structure. Building height above grade was estimated from photographs taken during the rapid assessment.
- 2017 Digital Elevation Model (DEM) – obtained from Horry County. 2020 DEM was not available until after the digitization was complete. The 2017 DEM served as the primary base map for the SFZ digitization and analysis, as it was the elevation dataset acquired closest to the date of Florence (2018).
- Preliminary FEMA data – 2019 digital FEMA maps obtained from Horry County, including BFE transects.
- Other reference GIS data from Horry County – e.g., roads, hydrology (rivers), buildings, communities, county boundary

### **Methods**

- **Creating transition points & subzones boundaries.** Before the SFZ could be digitized, the Florence Flood elevations (high water marks) were used to create the transition points that would serve as the “boundaries” between the different subzones. This process began in the east portion of the county, where the Waccamaw River enters Horry County. Each subzone is assigned an adjusted BFE, using one foot intervals. For example, the BFE subzone 26 represents a flood elevation of 26 feet (above NAVD88), and all areas within this subzone have an adjusted

BFE of 26 feet. In addition, all high-water marks that are between 26 and 27 feet (above NAVD88) are included within the 26 subzone, which means each subzone is a relatively conservative estimate of the flooding during Florence.

- **Symbolizing & interpreting the subzone elevations.** For each subzone, the approximate Florence flood elevation contour was symbolized by shading the DEM to the appropriate whole number elevation. For example, in the 27-foot subzone, the DEM was symbolized to highlight elevation values near 27 feet; the resulting shaded DEM was used to interpret an approximate 27-foot flood contour.
- **Digitizing the SFZ & subzones.** Each subzone was digitized using the polygon feature in ArcMap at 1-foot flood intervals. The stepwise interpretation of subzones using flood contours continued for areas affected by Florence and where flood elevation data existed (downstream along the Waccamaw River and its major tributaries, into the ICW near Socastee, and north along the Little Pee Dee River).

### Notes & Caveats

- The BFE values were rounded down to the nearest whole number within each subzone. Therefore, each subzone represents the area that would be inundated by a flood level equivalent to the assigned BFE. This means that the SFZ is a relatively conservative depiction of the flooding during Florence (as a location that has a high-water mark of 26.8 feet is included in the 26-foot subzone).
- In some cases, (along the Little Pee Dee Watershed) HWMs immediately outside the Horry County boundary were utilized to estimate location of SFZ subzones.
- The SFZ was only digitized within the boundaries of Horry County, even when the floodplain and flood elevations extended beyond the county line.
- The SFZ is not continuously mapped within Horry County. In a few areas, there is a lack of data control (no high-water marks exist nearby) and therefore the SFZ was not interpreted. This is true along the Waccamaw River near the southern boundary of Horry County (southern portions of subzones 11 and 15, near the confluence of Bull Creek and the Waccamaw), as well as several stretches along the Little Pee Dee River between Bucksport and Pee Dee Crossroads, Pee Dee Crossroads and Dog Bluff, Dog Bluff and Galivants Ferry, and north of Floyds Crossroad.
- In some of the locations along the Little Pee Dee where the SFZ could not be interpreted (due to lack of high water marks), additional subzones were digitized using less reliable flood elevation data. This separate file can be viewed in conjunction with the primary SFZ, but there is less confidence in the boundaries between these subzones due to the method of obtaining flood elevations. In these areas, flood elevations were estimated using the building damage data (rapid, post-storm, damage assessments obtained by Horry County, which estimate the amount of flooding in a building), the DEM (to get a ground elevation), and damage photos (to estimate building height above grade).
- This SFZ (and associated subzones) represent the raw and highly detailed results of the digitization of flood-elevations, interpreted using Florence flood data and a DEM. More practical generalized “zones” may need to be created for the regulation of development.