

HAND output explanation

All output file names from this HAND package will follow this general format:

project name*-*output type*.*file type

Where, ***project name*** refers to the project name designated at the start of the HAND mapping process. For hurricane related mapping, the ***project name*** is generally just the name of the hurricane (Harvey, Florence, etc.)

For the ***output type***, this portion of the output can take the following forms:

- 1) **catchments (vector)**: refers to the National Hydrography Dataset (NHD) watersheds that were used to calculate the flooding depths & elevations throughout the area of interest. In the attribute table of this shapefile you will find all of the information for each watershed from the NHD itself, as well as the associated National Water Model (NWM) discharge associated with that watershed and the HAND flood depth calculated using this package.
- 2) **flowlines (vector)**: refers to the NHD river/creek/etc. lines that were used to generate the source HAND layers as the “drainage” layer. These data are also the stream network used to estimate stream discharge via the NWM throughout the conterminous United States. Like the **catchments** output, these data have all the information from the NHD incorporated into them as well as the NWM discharge associated with each river/creek/etc. and the HAND flood depth calculated using this package.
- 3) **flood_bound (vector)**: refers to the maximum flooding extent calculated for the event and area of interest being analyzed. This is effectively just a shapefile format of the boundary that you can see in the **depth_map** and **elevation_map** outputs discussed below. For hurricanes, generally we will look at a range of dates that the hurricane was active, calculate the maximum discharges for all reaches in the area of interest, use those maximum discharges to calculate the water stage in each watershed from **catchments**, and then generate the flood map by subtracting the flood stage from the HAND raster to generate the flood depth throughout the area of interest.
- 4) **depth_map (raster)**: refers to the depth of flooding in meters within the **flood_bound**. As described in 3), this is calculated on a watershed to watershed basis for all of the watersheds in **catchments**. This depth map includes all values of flood depth greater than zero. Because of this, the output can often appear “noisy” and include water surfaces that are not necessarily considered to be “flooding”. With that, this **depth_map** layer allows the user of this output to recalculate the **flood_bound** based on whatever threshold of flooding is deemed significant. For example, a user might only be interested in flooding over 1 meter in depth. In that case, the user could make use of a GIS to find only the cells in the **depth_map** layer where the depth is greater than 1.
- 5) **elevation_map (raster)**: refers to the elevation of flooding in meters within the **flood_bound** based on the North American Vertical Datum of 1988 (NAVD88). This output is generated by

taking the **depth_map** output and adding it to the input digital elevation model (DEM) used to create the HAND layer in the first place.

For the ***file type***, the output of this package will generally take two forms:

- 1) **vector** formatted output files will be in the ESRI shapefile format which generally consists of multiple separate files (.shp, .shx, .prj, .dbf, .sbx, .sbn, etc.)
- 2) **raster** formatted output files will be in the geographically referenced Tag Image File Format (geoTIFF) which generally consists of three or four separate files (.tif, .tfw, .tif.aux.xml, & .tif.ovr).