The following maps, associated with the Community Vulnerability Study (CVS), were created to spatially locate exposure for built environment, population and ecologic features within Hillsborough County to sea level rise and storm surge in the year 2045. Sea level rise and storm surge data sets were provided by the Tampa Bay Regional Planning Council and follow the recommendations of the Climate Science Advisory Panel (2019), which was created to determine a unified projection for the region.

The scenarios used are:
- Sea Level Rise (SLR) (only), NOAA high: 2.165'
- Category 5 storm surge (only)
- Category 3 storm surge, with high and intermediate low SLR
- Category 1 storm surge, with high and intermediate low SLR

After completing a literature review, all known potential vulnerabilities to flood were put into a list, as a spreadsheet. This is titled the Matrix of Vulnerabilities (2019) and can be found in the appendix as part of the overall Community Vulnerability Study. Maps were made to include all elements of this list with available spatial data, to put them in relation to year 2045 flood scenarios. A summary of findings can be read in the Hillsborough County Vulnerability Report (2020).

**References**

Tampa Bay Climate Science Advisory Panel. (2019). Recommended projection of sea level rise in the Tampa Bay Region.
HURRICANE SCENARIOS
RESIDENTIAL PROPERTY

Layer Description:
A residential land includes single family homes, condominiums, townhouses/villas and apartments. Residential density is portrayed as dwelling units/acre.

Data Source:
This data was retrieved from the 2011 Land Use Land Cover data found at the Southwest Florida Water Management District Geospatial Open Data Portal.

LEGEND
- Residential Low Density (< 2 Dwelling Units)
- Residential Med Density (2-5 Dwelling Units)
- Residential High Density (>5 Dwelling Units)
- Residential Property Outside Hurricane Projections
- Sea level rise (SLR)
- Cat. 1 Hurricane, Intermediate Low SLR
- Cat. 1 Hurricane, High SLR
- Cat. 3 Hurricane, Intermediate Low SLR
- Cat. 3 Hurricane, High SLR
- Cat. 5 Hurricane
- 100yr Flood
SEA LEVEL RISE SCENARIOS
RESIDENTIAL PROPERTY

NARRATIVE
Layer Description:
A residential land includes single family homes, condominiums, townhouses/villas and apartments. Residential density is portrayed as dwelling units/acre.

Data Source:
This data was retrieved from the 2011 Land Use Land Cover data found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
All mobile home residents are required to evacuate even in a Category 1 setting due to their vulnerability to heavy rain and flooding.

Data Source:
This data was retrieved from the Hillsborough County Property Appraiser's website.
Layer Description: Populations living in mobile homes are more vulnerable due to the structures not being properly anchored to the ground. Due to the structure’s weakness and other associated factors with socioeconomic status of mobile home communities, they lack the ability to defend against sea level rise.

Data Source:
This data was retrieved from the Hillsborough County Property Appraiser’s website.
<table>
<thead>
<tr>
<th>Zones</th>
<th>Total In Zone</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>59</td>
<td>14%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>66</td>
<td>16%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>91</td>
<td>22%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>97</td>
<td>23%</td>
</tr>
<tr>
<td>Category 5</td>
<td>153</td>
<td>37%</td>
</tr>
</tbody>
</table>
Layer Description:
Commercial property refers to real estate property that is used for business activities. Subclasses include retail and wholesale, professional, cultural and entertainment, and tourist services, as well as others. These areas are extremely important for economic development, to which can be hampered by hurricane and flooding events.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
Industrial property is a main asset class of commercial property. These properties typically contain a mix of warehouses, distribution centers, and factories. When in areas subject to storm surge, many large businesses might be affected and the release of materials that contain hazardous chemicals have risk of being released. Large economic losses might result from these properties being affected.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Industrial property is a main asset class of commercial property. These properties typically contain a mix of warehouses, distribution centers, and factories. Sea level rise may affect these areas and the release of materials that contain hazardous chemicals have risk of being released. Large economic losses might result from these properties being affected.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
Libraries are an important community resource because they provide free educational resources to everyone, regardless of level of income.

Data Source:
This data is available on Hillsborough County’s Geohub public platform.
Layer Description:
Libraries are an important community resource because they provide free educational resources to everyone, regardless of level of income.

Data Source:
This data is available on Hillsborough County's Geohub public platform.
Layer Description:
Schools, while used for their traditional purposes, are also used as evacuation centers in case of emergencies like floods and hurricanes.

Data Source:
Original layer with addresses sourced through Hillsborough County Schools’ website.
LEGEND

(!) Schools

Major Roads and Highways

Sea level rise (SLR)

SCALE

0 20,000 Feet

NARRATIVE

Layer Description:
Schools, while used for their traditional purposes, are also used as evacuation centers in case of emergencies like floods and hurricanes.

Data Source:
Original layer with addresses sourced through Hillsborough County Schools’ website.
Layer Description:
Parks and trails are essential public goods that help communities connect with nature and practice healthier lifestyles. These spaces can be used as protective barriers in hurricane and flood settings but can also be damaged by either event.

This map does not include parks and recreation facilities owned by Temple Terrace or Plant City.

Data Source:
This data was retrieved from the Hillsborough County's open data GeoHub.
Layer Description:
Parks and trails are essential public goods that help communities connect with nature and practice healthier lifestyles. These spaces can be used as protective barriers in hurricane and flood settings but can also be damaged by either event.

This map does not include parks and recreation facilities owned by Temple Terrace or Plant City.

Data Source:
This data was retrieved from the Hillsborough County's open data GeoHub.
Layer Description:
Hotels can be used for tourism or in evacuation settings, provided they are not located in mandatory evacuation zones.

Data Source:
This data was retrieved from the North American Industry Classification System (NAICS). The codes for hotels include 721110, 721120, and 721191. The data is available through catalog.data.gov.
<table>
<thead>
<tr>
<th>Zones</th>
<th>Total In Zone</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>66</td>
<td>14%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>87</td>
<td>18%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>174</td>
<td>36%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>182</td>
<td>38%</td>
</tr>
<tr>
<td>Category 5</td>
<td>295</td>
<td>61%</td>
</tr>
</tbody>
</table>
Regarding sea level rise, hotels that are on or near the coastline and their associated massive structures can have ecological consequences with habitat migration. Since they are most often a non-adaptive, hardened coastline structure, the migration of coastal environments may be inhibited as saltwater moves farther inland.

Data Source:
This data was retrieved from the North American Industry Classification System (NAICS). The codes for hotels include 721110, 721120, and 721191. The data is available through catalog.data.gov.
In 2017, the 2,466 farms located in Hillsborough yielded agricultural products valued at over $865 million, making this county the 4th largest agricultural producer in the state of Florida. Additionally, UF IFAS estimates that for every dollar of agricultural goods sold outside the county $1.86 is added back into local economy due to indirect benefits of production, such as jobs and taxes. The most at-risk agricultural land for sea level rise and storm surge is in the southern portion of the county in and around Riverview, Ruskin, Wimauma, and Sun City. A small area of at-risk land is also located in the northwestern corner of the county, which is located in the Category 5 projected surge. Types of agricultural production at-risk in these areas include citrus, pasture and sod, as well as a number of miscellaneous agricultural commodities.

Data Source:
The following data was retrieved from the 2011 Land Use Land Cover maps provided in open data source format from the Southwest Florida Water Management District and Plan Hillsborough.
NARRATIVE

Layer Description:
In 2017, the 2,466 farms located in Hillsborough yielded agricultural products valued at over $865 million, making this county the 4th largest agricultural producer in the state of Florida. Additionally, UF IFAS estimates that for every dollar of agricultural goods sold outside the county $1.86 is added back into local economy due to indirect benefits of production, such as jobs and taxes. The most at-risk agricultural land for sea level rise and storm surge is in the southern portion of the county in and around Riverview, Ruskin, Wimauma, and Sun City. A small area of at-risk land is also located in the northwestern corner of the county, which is located in the Category 5 projected surge. Types of agricultural production at-risk in these areas include citrus, pasture and sod, as well as a number of miscellaneous agricultural commodities.

Data Source:
The following data was retrieved from the 2011 Land Use Land Cover maps provided in open data source format from the Southwest Florida Water Management District and Plan Hillsborough.
Layer Description: Power plants displayed here include any operable electric generating plants in Hillsborough County. This includes all plants that are operating, on standby, or short- or long-term out of service with a combined nameplate capacity of 1 MW or more. Power generation is critical to response and recovery post-disaster, and power generating capability may not meet total demand during extreme weather conditions.

Data Source: U.S. Energy Information Administration (2019)
Layer Description:
Power plants displayed here include any operable electric generating plants in Hillsborough County. This includes all plants that are operating, on standby, or short- or long-term out of service with a combined nameplate capacity of 1 MW or more. Power generation is critical to response and recovery post-disaster, and power generating capability may not meet total demand during extreme weather conditions.

Data Source:
Food pantries are organizations that provide meals, rations, or other food supplies to families based on the organization’s criteria for need or assistance. Criteria for assistance often includes providing proof of residency in the pantry’s area of influence in addition to showing evidence of low income or hardship. There are an estimated 151 food pantries located throughout Hillsborough County, which mainly include secular non-governmental and faith-based organizations. Due to the number of different food pantry resources, the exact reliance or utilization of food pantry assets is difficult to estimate. However, Feeding Tampa Bay, the local extension of Feeding America, estimates that over 52 million meals are delivered to at-need individuals annually by that organization alone.

Data Source:
The data was retrieved from the Tampa Bay Network to End Hunger’s website.
<table>
<thead>
<tr>
<th>Zones</th>
<th>Total In Zone</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>8</td>
<td>5%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>12</td>
<td>8%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>22</td>
<td>15%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>23</td>
<td>15%</td>
</tr>
<tr>
<td>Category 5</td>
<td>45</td>
<td>30%</td>
</tr>
</tbody>
</table>
Layer Description:
Food processing and storage areas are crucial to the county’s food supply. Over 112 parcels (over 753 acres) are designated for some form of food processing, most of which are found between the airport to the west and Seffner to the east. The food processing industry in Hillsborough County is widely diverse ranging from milk/dairy processing, fruit and vegetable packing, processing, and canning, meat processing, bakeries, catering, and food innovation.

Data Source:
This data can be found at the Hillsborough County Property Appraiser’s office. Within the shapefile, property Use Codes - Packing Plant (DOR 4400), Bottling/Cannery (DOR 4500), and Food Processing (DOR 4600) were used to identify food processing and storage parcels.
<table>
<thead>
<tr>
<th>Zones</th>
<th>Total In Zone</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>7</td>
<td>6%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>16</td>
<td>15%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>17</td>
<td>16%</td>
</tr>
<tr>
<td>Category 5</td>
<td>51</td>
<td>47%</td>
</tr>
</tbody>
</table>
Historic buildings have significant cultural relevancy, but are also often vulnerable to storms and catastrophic weather events because of historic standards. Also, construction materials used in the past are now understood to be harmful to the environment if released or damaged. The disposal/handling of structural debris of all types is regarded as a potential environmental and health threat.

Data Source:
This data was taken from the Bureau of Archaeological Research, FGDL metadata explorer.
Historic buildings have significant cultural relevancy, but are also often vulnerable to storms and catastrophic weather events because of historic standards. Also, construction materials used in the past are now understood to be harmful to the environment if released or damaged. The disposal/handling of structural debris of all types is regarded as a potential environmental and health threat.

Data Source:
This data was taken from the Bureau of Archaeological Research, FGDL metadata explorer.
Layer Description:
The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources. This map shows a comprehensive inventory of all cultural resources that are listed on the National Register of Historic Places. However, this dataset excludes all features deemed 'restricted' or 'sensitive', such as sensitive archeological sites.

Data Source:
Data was retrieved from the National Park Service GIS Data Services Directory.
Layer Description:
The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources. This map shows a comprehensive inventory of all cultural resources that are listed on the National Register of Historic Places. However, this dataset excludes all features deemed 'restricted' or 'sensitive', such as sensitive archaeological sites.

Data Source:
Data was retrieved from the National Park Service GIS Data Services Directory.
Layer Description:
Flooded cemeteries can release chemicals into the soil such as arsenic, mercury, formaldehyde, varnishes, sealers, preservatives, lead, zinc, copper, and steel. There is also the concern that historical infectious bacterial and viral diseases could be spread, although not likely.

1 cemetery within any hurricane category
Oaklawn and St. Louis Catholic Cemetery

Data Source:
Bureau of Archaeological Research, FGDL metadata explorer
<table>
<thead>
<tr>
<th>Zones</th>
<th>Total In Zone</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Category 5</td>
<td>2</td>
<td>10%</td>
</tr>
</tbody>
</table>
Layer Description:
A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

Data Source:
This data was retrieved from Hillsborough County’s Emergency Management Department.
Layer Description:
A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

Data Source:
This data was retrieved from Hillsborough County's Emergency Management Department.
Layer Description:
Flooding can affect not only private and public property, but can also disable critical infrastructure and emergency services. Fire stations are critical infrastructure during a natural disaster like a hurricane or flood. In addition, firefighters are directly tied to the Emergency Operations Command that is enacted during an emergency. It is crucial that fire stations remain functioning during a disaster due to the amount of calls they take in emergency situations. They are also crucial to recovery aspects after a disaster because fire risk greatly increases due to complications in getting houses back on the electricity grid.

Data Source:
University of Florida GeoPlan Center
Flooding can affect not only private and public property, but can also disable critical infrastructure and emergency services. Fire stations are critical infrastructure during a natural disaster like a hurricane or flood. In addition, firefighters are directly tied to the Emergency Operations Command that is enacted during an emergency. It is crucial that fire stations remain functioning during a disaster due to the amount of calls they take in emergency situations. They are also crucial to recovery aspects after a disaster because fire risk greatly increases due to complications in getting houses back on the electricity grid.

Data Source:
University of Florida GeoPlan Center
Hospitals and Ambulatory Care Outside Hurricane Projections

Layer Description:
Hospitals become overwhelmed in a disaster scenario and are additionally challenged by power outages and gaps in clean water supply. They must be able to provide continuous care for existing patients and for those injured during the storm.

Data Source:
The data for hospitals is available on Hillsborough County's GeoHub public platform.

Legend:
- Hospitals and Ambulatory Care Outside Hurricane Projections
- Hospitals and Ambulatory Care
- Major Roads and Highways
  - Sea level rise (SLR)
  - Cat. 1 Hurricane, Intermediate Low SLR
  - Cat. 1 Hurricane, High SLR
  - Cat. 3 Hurricane, Intermediate Low SLR
  - Cat. 3 Hurricane, High SLR
  - Cat. 5 Hurricane
  - 100yr Flood
Layer Description:
Hospitals must be able to provide continuous care for existing patients and be accessible.

Data Source:
The data for hospitals is available on Hillsborough County’s Geohub public platform.
Layer Description:
The police are crucial members of the Emergency Operations Center as they are involved in helping before, during, and after a major hurricane or flooding event. It is essential that police stations remain operable during a flooding scenario as they partner with the fire department and the Department of Emergency Management to assist in recovery aspects of a disaster.

Data Source:
This data was retrieved from the City of Tampa, Plant City, and Hillsborough County's Sheriff's Office websites.
<table>
<thead>
<tr>
<th>Storm Surge Zones</th>
<th>Total In Zone</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 5</td>
<td>2</td>
<td>20%</td>
</tr>
</tbody>
</table>
Layer Description:

In the event of an emergency, Hillsborough County has 45 emergency shelters designed to serve as a location for residents and visitors to go if an evacuation order is issued that provides a safe area to stay on an "as-needed" basis. The capacity of the pre-identified shelters will hold an estimated 42,900 residents with 16 shelters meeting all Americans with Disabilities Act (ADA) requirements. Shelters must have the capability to feed a large population through a commercial kitchen and provide enough space in areas with minimal windows for people to stay during the storm.

Data Source:
The following data was retrieved from the Hurricane Evacuation Assessment Tool (HEAT) on the Hillsborough County website.
Layer Description:
Prisons house vulnerable populations who are confined to the decisions made by other people. Evacuating prisoners poses a vast amount of logistical issues in terms of security and protection. There have been many past mishaps in terms of not evacuating flooded prisons that created long-term negative health outcomes of those who were trapped in flooding jails.

Analysis:
In Hillsborough County, there are two jails, two juvenile detention facilities, and one assessment center. In a Category 3 intermediate low scenario, the Orient Road Jail will be impacted. In a Category 5 hurricane/storm surge scenario, the Hillsborough Juvenile Detention Center West and the ACTS Juvenile Assessment Center will be affected. Falkenburg Road Jail and Columbus Youth Academy will not be affected by any of the scenarios chosen.

Data Source:
Locations of jails located in Hillsborough County were first identified by searching on the Hillsborough County Sheriff's Office. The locations of juvenile detention facilities were retrieved from the Florida Department of Juvenile Justice website.
Layer Description:
Flood zones are geographic areas that the Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk.

Moderate to Low Risk Areas
Zone X - An area that is determined to be outside the 1% and 0.2% annual chance flood plains.

High Risk Areas (Special Flood Hazard Area)
Zone A - An area inundated by 1% annual chance flooding, for which no Base Flood Elevations (BFEs) have been determined. Are typically located near bodies of water, are the second most vulnerable properties. They are considered to have a high potential of flooding due to the rising of water and are required to have flood insurance. There are five types of A Zones: A, A#, AE, AO, AH.

Zone AE - An area inundated by 1% annual chance flooding, for which BFEs have been determined.

High Risk - Coastal Areas
Zone V - The most hazardous flood zones and are typically beachfront coastal properties that are subject to additional hazards associated with the increase of wave velocity in storm-induced waves. There are three types of V Zones: V, V#, V.

Zone VE - An area inundated by 1% annual chance flooding with velocity hazard (wave action), BFEs have been determined.

Data Source:
This data was retrieved from Hillsborough County's website.
An urban service area (USA) was established as part of the long-range comprehensive plan. It focuses growth to a geographically-defined area which is planned for urban services and utilities.

The following data was retrieved from Plan Hillsborough’s website.
Layer Description:
Buildings must adhere to state building codes, which have changed over time. Bracing and materials may be different depending on the year buildings were built. For all repairs and renovation that exceed 50% of the building, construction must adhere to the most recent building code. The years specified below indicate major changes to the Florida Building Code that affect a building’s ability to withstand hurricanes or flooding. The most major change occurred after Hurricane Andrew in 2002.

In 1980, Flood Damage Control Regulations were adopted in Hillsborough County (Both City of Tampa and Hillsborough County) (Henry, 2019). In 2002, the Florida Building Code was transformed after Hurricane Andrew and included new hurricane resistant standards. The Florida Building Commission took control of the code and at this time it superseded all local building codes.

Data Source:
This data was retrieved from the Hillsborough County Property Appraiser's website.
Buildings must adhere to state building codes, which have changed over time. Bracing and materials may be different depending on the year buildings were built. For all repairs and renovations that exceed 50% of the building, construction must adhere to the most recent building code. The years specified below indicate major changes to the Florida Building Code that affect a building's ability to withstand hurricanes or flooding. The most major change occurred after Hurricane Andrew in 2002.

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Data Source:
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Buildings must adhere to state building codes, which have changed over time. Bracing and materials may be different depending on the year buildings were built. For all repairs and renovation that exceed 50% of the building, construction must adhere to the most recent building code. The years specified below indicate major changes to the Florida Building Code that affect a building's ability to withstand hurricanes or flooding. The most major change occurred after Hurricane Andrew in 2002.

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Data Source:
This data was retrieved from the Hillsborough County Property Appraiser's website.
BUILDINGS must adhere to state building codes, which have changed over time. Bracing and materials may be different depending on the year buildings were built. For all repairs and renovation that exceed 50% of the building, construction must adhere to the most recent building code. The years specified below indicate major changes to the Florida Building Code that affect a building's ability to withstand hurricanes or flooding. The most major change occurred after Hurricane Andrew in 2002.

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In 1980, Flood Damage Control Regulations were adopted in Hillsborough County (both City of Tampa and Hillsborough County) (Henry, 2019). In 2002, the Florida Building Code was transformed after Hurricane Andrew and included new hurricane resistant standards. The Florida Building Commission took control of the code and at this time it superseded all local building codes.

Data Source: This data was retrieved from the Hillsborough County Property Appraiser’s website.
Layer Description:
Airports are vital pieces of infrastructure that play key roles in the preparation and recovery of an area affected by flooding. Without airports, the logistics and distribution of aid becomes nearly impossible. In Hillsborough County, the majority of larger, more capable airfields are within the risk area for flooding events related to tropical storms and hurricanes. These facilities are also large revenue generators for the Tampa Bay and Hillsborough County area. There are two major airports, seven minor airports, and thirteen helipads in the county.

Data Source:
Data were retrieved from the U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Atlas Database and AirNav.com.
Navigable roads are essential before, during, and after storm events for evacuation and recovery.

Data Source:
The data was retrieved from the Hillsborough County GeoHub website.
HILLSBOROUGH COUNTY
SEA LEVEL RISE SCENARIOS
ROADS

SCALE

NARRATIVE
Layer Description:
Navigable roads are essential before, during, and after storm events for evacuation and recovery.

Data Source:
The data was retrieved from the Hillsborough County GeoHub website.

LEGEND
- Roads Within SLR
- Roads Within Hurricane Scenarios
- Major Roads and Highways
- Roads
- Sea level rise (SLR)
Layer Description:
In disaster settings, bridges and overpasses can sustain structural damage or can be blocked due to debris from flooding. There are 752 bridges and overpasses in Hillsborough County.

Data Source:
Data retrieved from the National Bridge Inventory (NBI) (2017).
Layer Description:
In disaster settings, bridges and overpasses can sustain structural damage or can be blocked due to debris from flooding. There are 752 bridges and overpasses in Hillsborough County.

Data Source:
Data retrieved from the National Bridge Inventory (NBI) (2017).
LEGEND

Historical Bridges
Historical Bridges, 1,000 ft Buffer (Buffer shown for visualization purposes only)
Major Roads and Highways
Sea level rise (SLR)
Cat. 1 Hurricane, Intermediate Low SLR
Cat. 1 Hurricane, High SLR
Cat. 3 Hurricane, Intermediate Low SLR
Cat. 3 Hurricane, High SLR
Cat. 5 Hurricane
100yr Flood

NARRATIVE

Layer Description:
Bridges are an essential element of roadway systems. Bridges are affected by rising waters and flood events. Existing infrastructure is not always built to current safety requirements.

Data Source:
The data source was retrieved from the Bureau of Archaeological Research, FGDL metadata explorer.
Layer Description:
Bridges are an essential element of roadway systems. Bridges are affected by rising waters and flood events. Existing infrastructure is not always built to current safety requirements.

Data Source:
The data source was retrieved from the Bureau of Archaeological Research, FGDL metadata explorer.
Layer Description:
There are four evacuation zones, A, B, C, D, and E. Zone A is the first area required to evacuate with subsequent areas after.

A hurricane evacuation route (also called coastal evacuation route or evacuation route) is a highway in the United States that is a specified route for hurricane evacuation.

Data Source:
The data for both evacuation routes and zones are available on Hillsborough County's Geohub public platform.
LEGEND

- Major Roads and Highways
- Railroads
- Sea level rise (SLR)
- Cat. 1 Hurricane, Intermediate Low SLR
- Cat. 1 Hurricane, High SLR
- Cat. 3 Hurricane, Intermediate Low SLR
- Cat. 3 Hurricane, High SLR
- Cat. 5 Hurricane
- 100yr Flood

NARRATIVE

Layer Description:
Railroads in Hillsborough County function today mainly as freight transportation. These are privately owned CSX lines that are crucial to county infrastructure in transporting bulk products such as phosphate.

Data Source:
This data was retrieved from the Hillsborough County’s open data GeoHub.
Layer Description:
Railroads in Hillsborough County function today mainly as freight transportation. These are privately owned CSX lines that are crucial to county infrastructure in transporting bulk products such as phosphate.

Data Source:
This data was retrieved from the Hillsborough County's open data GeoHub.
**Layer Description:**
Buses allow those without cars to get to work, home, to the grocery store, etc. In addition, they are also used in evacuation settings to help residents get to safety. This is the only kind of public transportation offered in the county besides the Downtown to Ybor rail car. Flooding can cause bus routes to be disrupted which can affect residents' ability to go about their daily lives after a hurricane or flooding scenario.

**Data Source:**
The following data was pulled from GIS Shapefiles on the HART Transit Facilities website.
Layer Description:
Bathymetry is a topographic map of below sea level conditions. The ocean floor is connected to coastal habitat adaptation to sea level rise and potentials for living shoreline habitat as storm defense mechanisms. Navigable waters in the region are both naturally occurring and manmade canals for tourism and industry.

Data Source:
Data was retrieved from the U.S. Department of Transportation, Bureau of Transportation Statistics through the FGDL Metadata Explorer.
Layer Description:
A wastewater facility gathers municipal wastewater sewage to treat. Treatment removes contaminants and pollutants before releasing water back into the environment. Inclement weather can damage a facility, which effectively puts untreated water back in the watershed.

Data Source:
The following data was retrieved from the Florida Department of Environmental Protection.
Layer Description:
A wastewater facility gathers municipal wastewater sewage to treat. Treatment removes contaminants and pollutants before releasing water back into the environment. Inclement weather can damage a facility, which effectively puts untreated water back in the watershed.

Data Source:
The following data was retrieved from the Florida Department of Environmental Protection.
Layer Description:
Septic tanks are the underground storage locations for sewage. Sewage is decomposed while in the septic tank before draining to the soil of the property. A functioning septic tank relies on properly draining soils and lower water table. Septic systems along the coast will be challenged by sea level rises and will not function as ground water levels become higher and flooding events more regular.

Data Source:
This data source was retrieved from the Florida Department of Health Environmental Health GIS Data Exchange.
<table>
<thead>
<tr>
<th>Zones</th>
<th>Total In Zone</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>1,289</td>
<td>5%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>1,482</td>
<td>6%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>2,301</td>
<td>10%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>2,441</td>
<td>10%</td>
</tr>
<tr>
<td>Category 5</td>
<td>4,645</td>
<td>20%</td>
</tr>
</tbody>
</table>
Layer Description:
Septic tanks are the underground storage locations for sewage. Sewage is decomposed while in the septic tank before draining to the soil of the property. A functioning septic tank relies on properly draining soils and lower water table. Septic systems along the coast will be challenged by sea level rises and will not function as ground water levels become higher and flooding events more regular.

Data Source:
This data source was retrieved from the Florida Department of Health Environmental Health GIS Data Exchange.

Legend:
- Septic Tanks Within SLR
- Septic Tanks Outside Hurricane Projections
- Major Roads and Highways
- Sea level rise (SLR)
Layer Description:
A manmade water reservoir collects and slows the flow of water before entering into the stormwater systems. They are helpful during a heavy rain event because it helps prevent flooding and sewer issues, and is the first stage in water treatment.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
A manmade water reservoir collects and slows the flow of water before entering into the stormwater systems. They are helpful during a heavy rain event because it helps prevent flooding and sewer issues, and is the first stage in water treatment.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
Landfills, commonly known as dumps, and solid waste transfer stations are located throughout the county. They are part of a large scale, collaborative effort to keep our county free of waste and debris. It is important for residents to prepare their homes and businesses for storm season to minimize extra debris on the property that can add to the burden of storm recovery. Additionally, it is important for the municipality to maintain a safe storm and flood protocol to keep solid waste contained - therefore protecting our environment and water.

Data Source:
This data was retrieved from the Department of Homeland Security's Homeland Infrastructure Foundation-Level Open Data Geoplatform.

LEGEND
- Solid Waste Landfill Facilities Outside Hurricane Projections
- Solid Waste Landfill Facilities
- Major Roads and Highways

- Sea level rise (SLR)
- Cat. 1 Hurricane, Intermediate Low SLR
- Cat. 1 Hurricane, High SLR
- Cat. 3 Hurricane, Intermediate Low SLR
- Cat. 3 Hurricane, High SLR
- Cat. 5 Hurricane
- 100yr Flood
Layer Description:
Landfills, commonly known as dumps, and solid waste transfer stations are located throughout the county. They are part of a large scale, collaborative effort to keep our county free of waste and debris. It is important for residents to prepare their homes and businesses for storm season to minimize extra debris on the property that can add to the burden of storm recovery. Additionally, it is important for the municipality to maintain a safe storm and flood protocol to keep solid waste contained - therefore protecting our environment and water. No solid waste landfill facilities are in area directly impacted by sea level rise.

Data Source:
This data was retrieved from the Department of Homeland Security's Homeland Infrastructure Foundation-Level Open Data Geoplatform.
Layer Description:
The physical damage caused by collapsed structures is not the only risk. The facilities hold gasoline on site which provide evacuation opportunities as well as act as a potential contamination of water source. Studies have shown that storm surge is responsible for the majority of petroleum releases, and the failure of storage tanks was the most common mechanism of release.
<table>
<thead>
<tr>
<th>Storm Surge Zones</th>
<th>Total In Zone</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level Rise</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Category 1 Low</td>
<td>46</td>
<td>9%</td>
</tr>
<tr>
<td>Category 1 High</td>
<td>54</td>
<td>11%</td>
</tr>
<tr>
<td>Category 3 Low</td>
<td>98</td>
<td>20%</td>
</tr>
<tr>
<td>Category 3 High</td>
<td>103</td>
<td>21%</td>
</tr>
<tr>
<td>Category 5</td>
<td>196</td>
<td>39%</td>
</tr>
</tbody>
</table>
Layer Description:
The extractive industry consists of any operations that remove metals, mineral, and aggregates from the earth. Examples of extractive processes include oil and gas extraction, mining, dredging and quarrying. According to The Digging, an online mining reference tool, Hillsborough County has 32 identified mines. The most common mines in the area are Phosphorus-Phosphates, Flourine-Fluorite, and Uranium.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
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Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Florida has 92 Superfund sites, and 17 exist in Hillsborough County. When the six scenarios are mapped, a total of nine Superfund sites are not affected. The Superfund site of most concern is the Raleigh Street Dump, for it is the only site that will be affected by a Category 1-intermediate low scenario. It is also important to note that this site is deemed ‘open,’ meaning it is not yet cleaned up and poses a threat to the surrounding environment and those who inhabit it. Prolonged inundation can erode safeguards keeping chemicals contained.

Data Source:
This data was retrieved by the United States Environmental Protection Agency [EPA] and last updated in 2018.
Florida has 92 Superfund sites, and 17 exist in Hillsborough County. When the six scenarios are mapped, a total of nine Superfund sites are not affected. The Superfund site of most concern is the Raleigh Street Dump. It is the only site that will be affected by a Category 1-intermediate low scenario. It is also important to note that this site is deemed ‘open,’ meaning it is not yet cleaned up and poses a threat to the surrounding environment and those who inhabit it. Prolonged inundation can erode safeguards keeping chemicals contained.

Data Source:
Layer Description:
Being unemployed adds an extra layer of strain on a household when it comes to preparing for a hurricane and flood event.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Those with no high school diploma are much more likely to live below the poverty line, where a lack of financial resources creates more negative health outcomes in regards to everyday life as well as in hurricane and flood settings. Education plays a role in respect to coping with the disaster over the longer term. The better educated were far less likely than others to live in a camps or other temporary housing, and instead, moved to private homes, stayed with family or friends, or rented a new home. It is important to note that, in general, the better educated tend to earn more, have greater wealth, and live longer and healthier lives. They also tend to be better protected against shocks either through some form of formal or informal insurance or through greater diversification of their livelihoods as well as their financial assets and social support.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Layer Description:
Low-income households are defined as those earning less than twice the federal poverty line. Public housing and low income housing most likely to not have proper hurricane protections for windows or mitigation measures in place.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Layer Description:
Low-income households are defined as those earning less than twice the federal poverty line. Public housing and low income housing most likely to not have proper hurricane protections for windows or mitigation measures in place.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Layer Description:
Single-parent families face increased vulnerability during hurricane and flooding scenarios because there is typically only one adult to help prepare the household for the event.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Veterans are a vulnerable population and deserve to be protected and cared for. In a disaster setting, veterans can experience increased cases of PTSD that affects them and their partners as veterans share a comorbidity with mental health and disability.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Layer Description:
Children are at an increased risk of experiencing more negative effects from hurricane and flooding events. For example, school disruption due to structural damage and use as emergency shelters may delay children's academic achievement. Children can experience heightened stress, fear, anxiety, inability to cope, and exaggerated response which can all manifest as developmental regression, withdrawal, clinginess, tantrums, enuresis, or somatic complaints, among other symptoms.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
People over the age of 65 can be more affected by hurricanes than others. Lack of electricity from a flood or hurricane event greatly increases their risk of heat stress and heat stroke, which is worsened by asthma, lung infection, and chronic obstructive pulmonary disease. The elderly are also at higher risk of experiencing other negative effects from hurricanes, as their mobility is decreased and it becomes harder for them to evacuate. Many people age 65+ have hearing impairments which might make it difficult to hear and comprehend warnings they receive. Like many other groups, older persons typically require more medications, which can go bad without refrigeration, or can be compromised when exposed to unclean floodwaters.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-Year Estimates.
Layer Description:
Many people have limited English ability whether from being an immigrant or refugee. Those with language barriers may have less access to warning information or experience more difficulties navigating recovery programs.

Data Source:
The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Layer Description: Many people have limited English ability whether from being an immigrant or refugee. Those with language barriers may have less access to warning information or experience more difficulties navigating recovery programs.

Data Source: The following data was taken from the U.S. Census 2017 American Community Survey 5-year estimates.
Layer Description:
The yellow dots on this map reflect the percentage of population that is reliant on public transportation. These households are not able to easily gather supplies to prepare for a storm (large quantities of food and water and construction material). Additionally, they are not able to evacuate on their own, and will increase the burden on local shelters.

Data Source:
This data was retrieved from the CDC's Social Vulnerability Index Shapefiles.
Layer Description:
Individuals with physical disabilities during times of emergencies face more difficulty to prepare and respond to the event, and can face long-term health impacts. Not all private properties have ramps or the ability to evacuate the property without assistance and in some cases, ramps may be damaged, blocked, or flooded. Individuals with physical disabilities may be reliant on tools such as electrical scooters for mobility that can be impaired by flood waters. The two most common forms of short-term housing for disaster survivors are apartments and trailers. People with mobility disabilities often have difficulties securing accessible apartments, including trailers provided by FEMA with accessibility issues. Even "accessible" trailers, with entry ramps, are often located in gravel fields and do not provide sufficient wheelchair radius inside or accessible bathrooms and kitchens.

Data Source:
This data was retrieved from the CDC’s Social Vulnerability Index Shapefiles.
Layer Description:
This landscape type is noted for its flat topography. Water does not flow as much as it percolates, saturating the soil, with slow runoff that occasionally creates very poorly defined first-order streams. This typically results in sheet flow patterns if water becomes high. They are naturally associated with a carpet of grasses and herbs and scattered trees. During the raining season, minimal water runoff results in waterlogged soils and there may be standing water for varying periods of time. Saltwater intrusion from storms and sea level rise will have an impact on the trees, plants, and agricultural fields. These landscapes can also be impeded by erosive effects of flooding. Other concerns rise from development affecting seed dispersal and habitat regime, pollution, and the introduction of exotic/invasive plants.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
This landscape type is noted for its flat topography. Water does not flow as much as it percolates, saturating the soil, with slow runoff that occasionally creates very poorly defined first-order streams. This typically results in sheet flow patterns if water becomes high. They are naturally associated with a carpet of grasses and herbs and scattered trees. During the raining season, minimal water runoff results in waterlogged soils and there may be standing water for varying periods of time. Saltwater intrusion from storms and sea level rise will have an impact on the trees, plants, and agricultural fields. These landscapes can also be impelled by erosive effects of flooding. Other concerns rise from development affecting seed dispersal and habitat regime, pollution, and the introduction of exotic/invasive plants.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description: In our flat Florida environment, lakes collect and filtrate water into the aquifer. A lake has multiple underwater zones with a rich biodiverse aquaculture.

Data Source: 2011 Land Use Land Cover, Southwest Florida Water Management District Geospatial Open Data Portal
Layer Description:
In our flat Florida environment, lakes collect and filtrate water into the aquifer. A lake has multiple underwater zones with a rich biodiverse aquaculture.

Data Source:
2011 Land Use Land Cover, Southwest Florida Water Management District Geospatial Open Data Portal
Layer Description:
Environmentally sensitive areas (ESAs) known as Wetlands are defined by USEPA (Environmental Protection Agency) and Clean Water Act §404 as a highly important natural resource that provide numerous benefits for people and wildlife.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal. Data compliant with National Map Accuracy Standards for 1:12,000 +/- 33.3 ft.
Layer Description:
Environmentally sensitive areas (ESAs) known as Wetlands are defined by USEPA (Environmental Protection Agency) and Clean Water Act §404 as a highly important natural resource that provide numerous benefits for people and wildlife.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
A wet prairie is a habitat found in flat or gently sloping areas with wet, but not inundated soils. The length of time that soils are flooded ranges from 3-7 months each year. Often a wet prairie is found between lower lying depression marshes or swamps and slightly higher pine flatwoods. Wet prairies can be affected by saltwater inundation, but also help buffer flooding scenarios from surrounding areas.

Data Source:
This data was retrieved from the 2011 Land Use Land Cover map.
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Data Source:
This data was retrieved from the 2011 Land Use Land Cover map.
Layer Description:
Seagrass meadows are highly dynamic ecosystems that house endangered species such as dugongs and seahorses. They are very important for the ecology of coastal ecosystems, but face threats due to climate change and sea level rise. Sea level rise can create increased depth and flooding causes turbidity, each of which can impact the health of sea grasses.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
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Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Mangroves are a group of trees that thrive in the coastal intertidal zone. They are essential to the overall health of the coastal ecosystem as they trap and cycle various chemicals, organic materials, and nutrients. They act as a defense to wave damage, large storms, and flooding, but can be damaged by hurricanes and be variably impacted by sea level rise.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
Mangroves are a coastal wetland that thrive in the intertidal zone. They are essential to the overall health of the coastal ecosystem as they trap and cycle various chemicals, organic materials, and nutrients. They act as a defense to wave damage, large storms, and flooding, but can be damaged by hurricanes and be variably impacted by sea level rise.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
LEGEN

Major Roads and Highways
Saltwater Marshes, 1,000 ft buffer
Saltwater Marshes
Sea level rise (SLR)
Cat. 1 Hurricane, Intermediate Low SLR
Cat. 1 Hurricane, High SLR
Cat. 3 Hurricane, Intermediate Low SLR
Cat. 3 Hurricane, High SLR
Cat. 5 Hurricane
100yr Flood

HURRICANE SCENARIOS
SALT WATER MARSHES

SCALE
0 Feet
20,000

NARRATIVE
Layer Description:
Salt marshes are coastal wetlands that are flooded and drained by salt water brought in by the tides. They are essential to healthy fisheries, coastlines, and communities. These ecosystems stand to be impacted by sea level rise.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
Salt marshes are coastal wetlands that are flooded and drained by salt water brought in by the tides. They are essential to healthy fisheries, coastlines, and communities. These ecosystems stand to be impacted by sea level rise.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
Tidal flats are areas on the low sea shores and low islands, which are flooded by sea during high tide and ebb.

Data Source:
This data was taken from the 2011 Land Use Land Cover map found at the Southwest Florida Water Management District Geospatial Open Data Portal.
Layer Description:
Tidal flats are areas on the low sea shores and low islands, which are flooded by sea during high tide and ebb.

Data Source:
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