

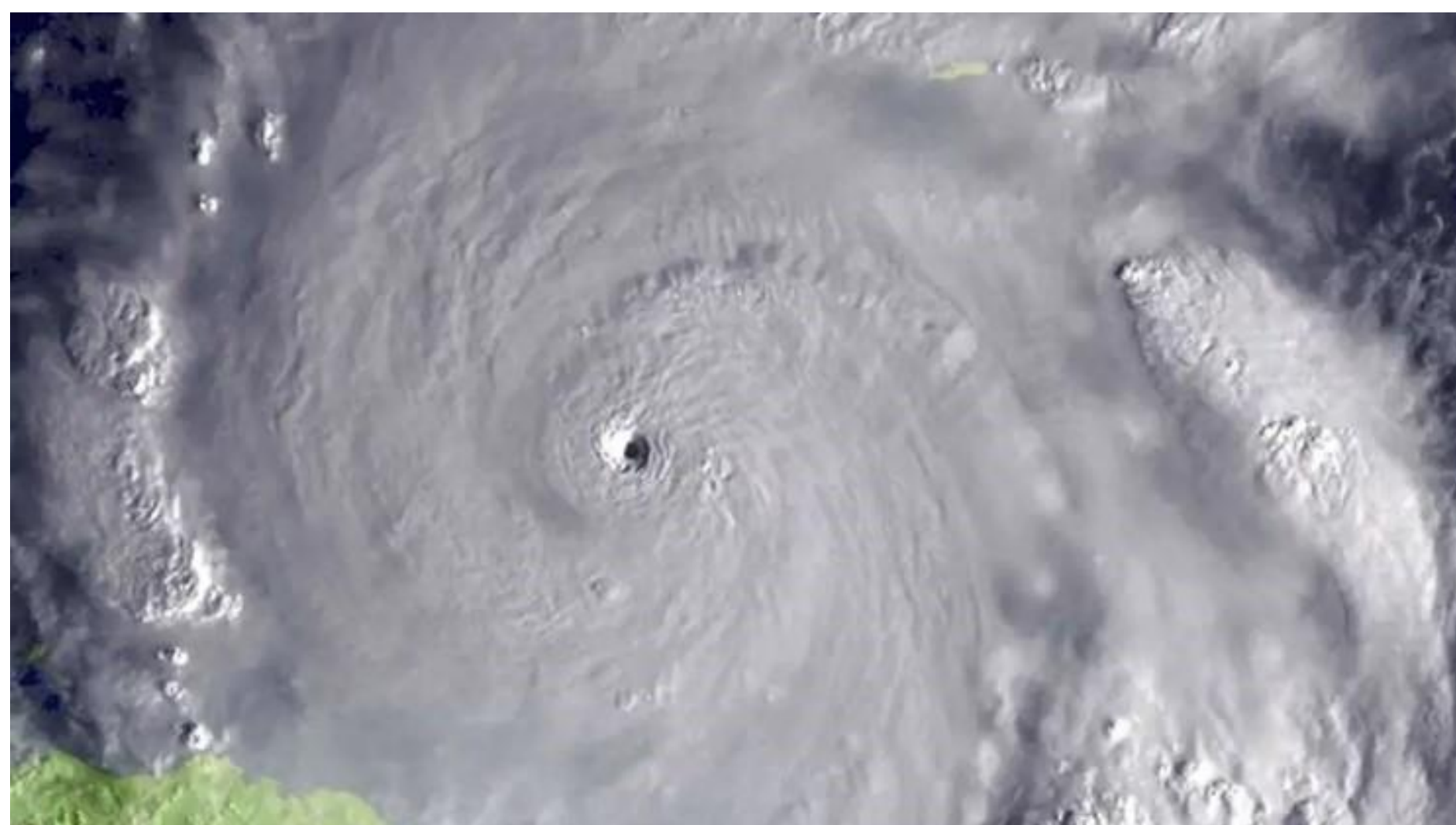


# Analysis of Storm Surge in Key West, Florida in The Event of a Worst-Case Scenario Category 5 Hurricane Landfall

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## Hurricanes

Hurricanes are sea-based storms that cause severe damage upon landfall. Storm surge is the most damaging and deadly aspect of a tropical cyclone. The changing climate is causing these storms to become stronger and more frequent. This begs the question, what would happen if a worst-case scenario hurricane makes landfall in a populated area like Key West, Florida?

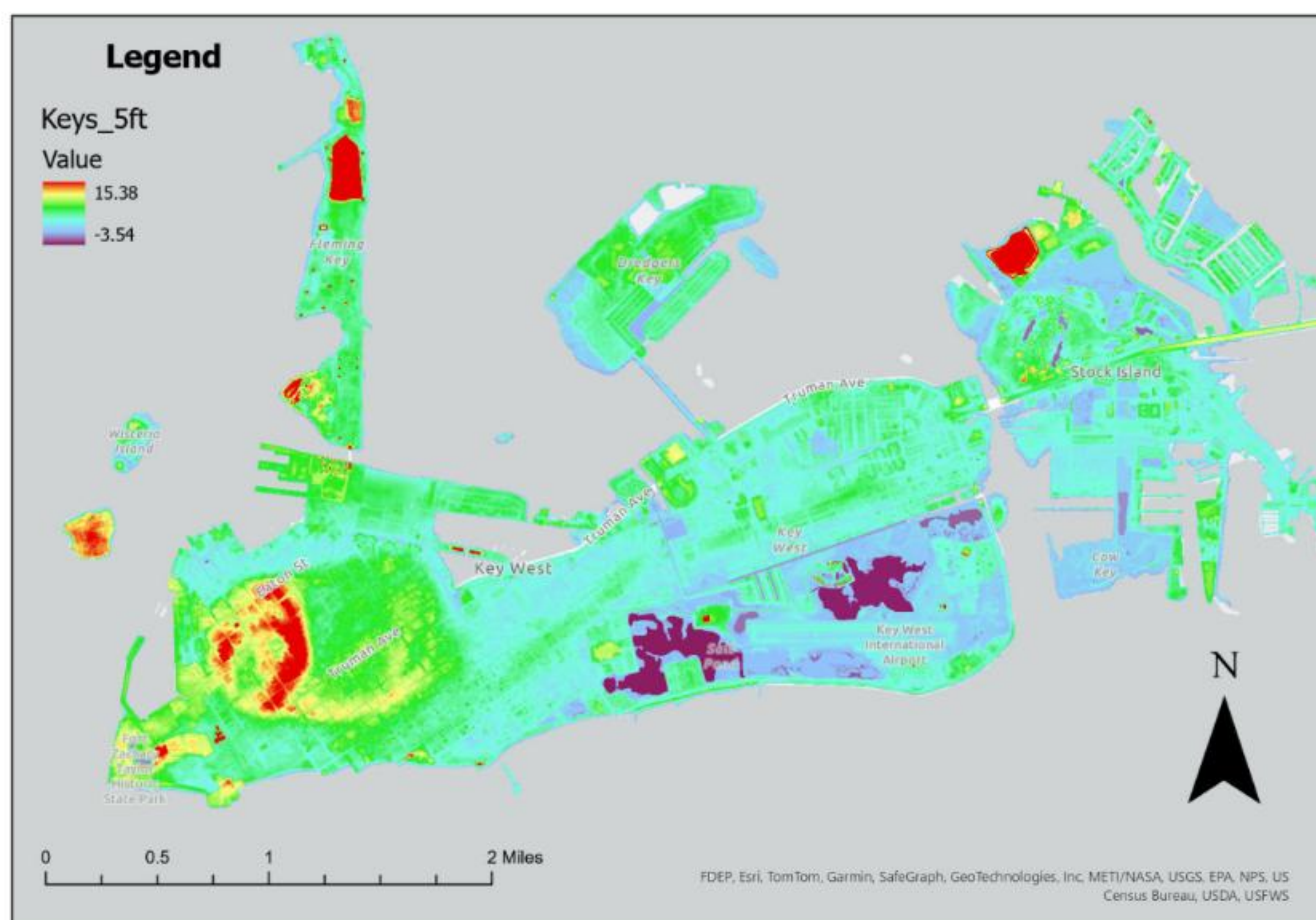


## RESEARCH QUESTIONS

1. How does Key West's elevations make the city vulnerable?
2. What would a worst-case scenario be?
3. What would be the inundation of storm surge be in a worst-case scenario?

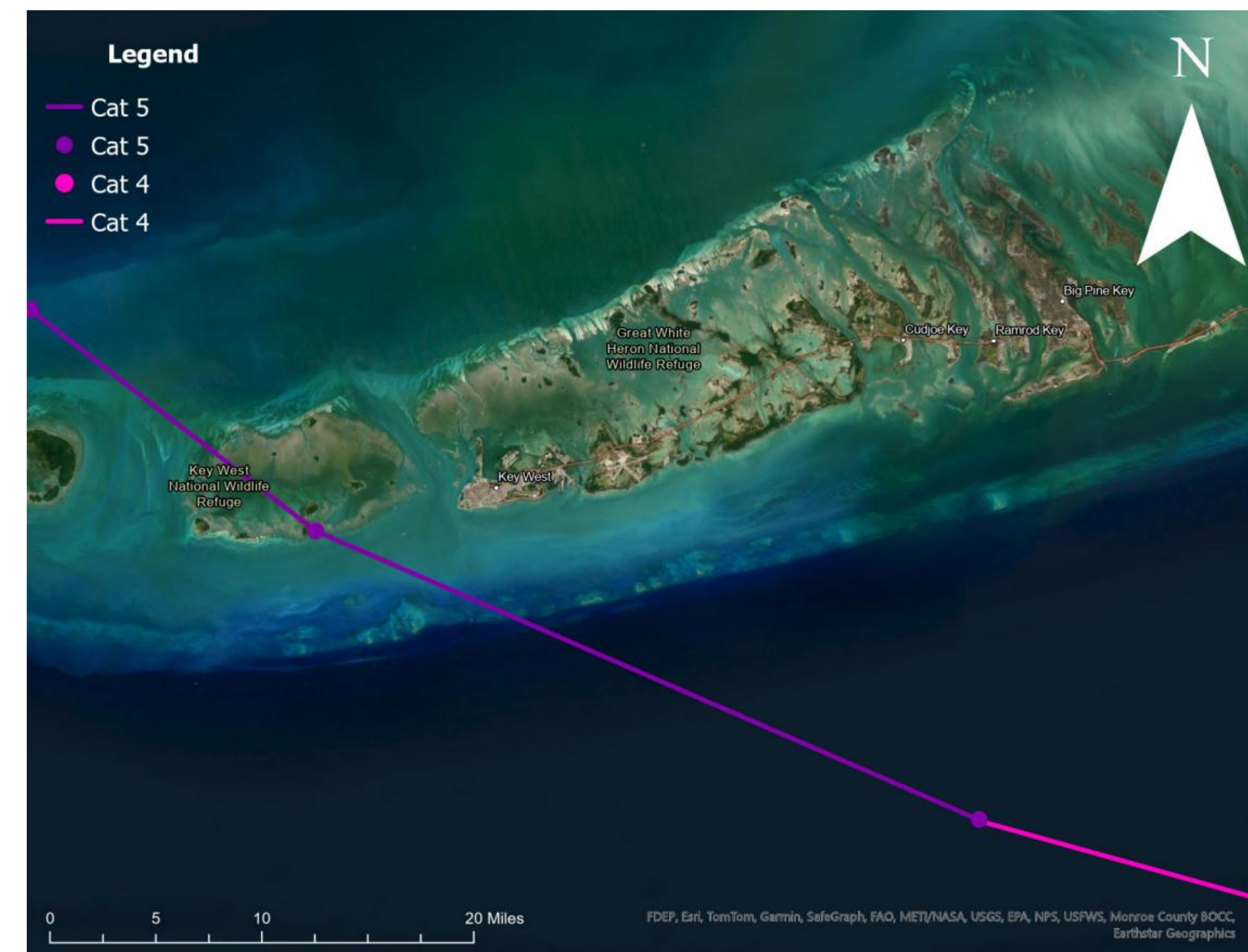
## Key West, Florida

Most of Key West's eastern half is at or below sea level. The western half of the city is higher than the eastern half with elevations at 3-9 ft. A hill on the western half reaches the tallest point of 16 ft



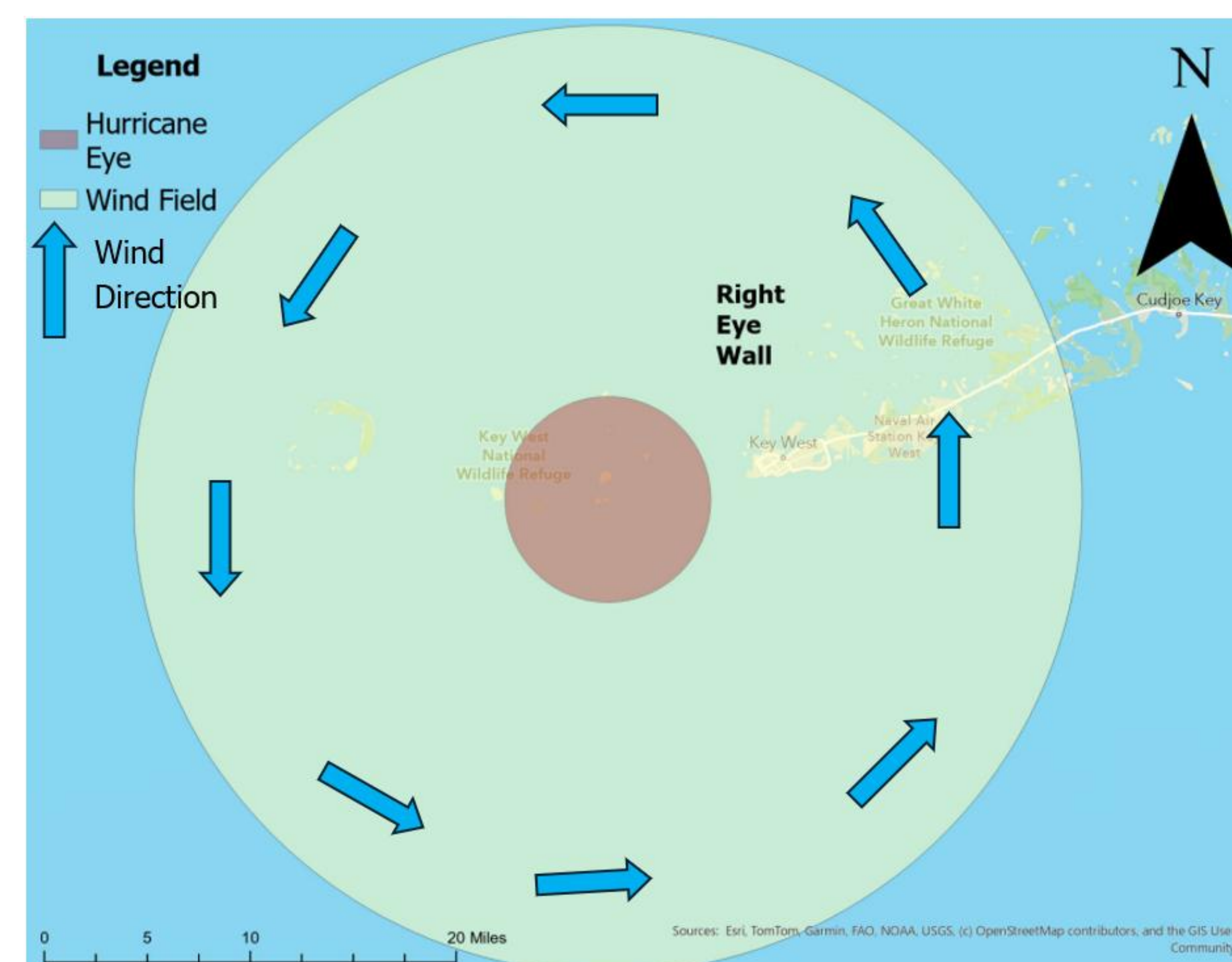
## Worst Case Scenario: "Hurricane Emilio"

- Emilio will be a Cape Verde Hurricane.
- Similar path of the 1935 Labor Day Hurricane.
- Wind speeds of 165 mph and gusts of 200 mph
- Mid September morning landfall will coincide with beginning of king tide and daily high tide



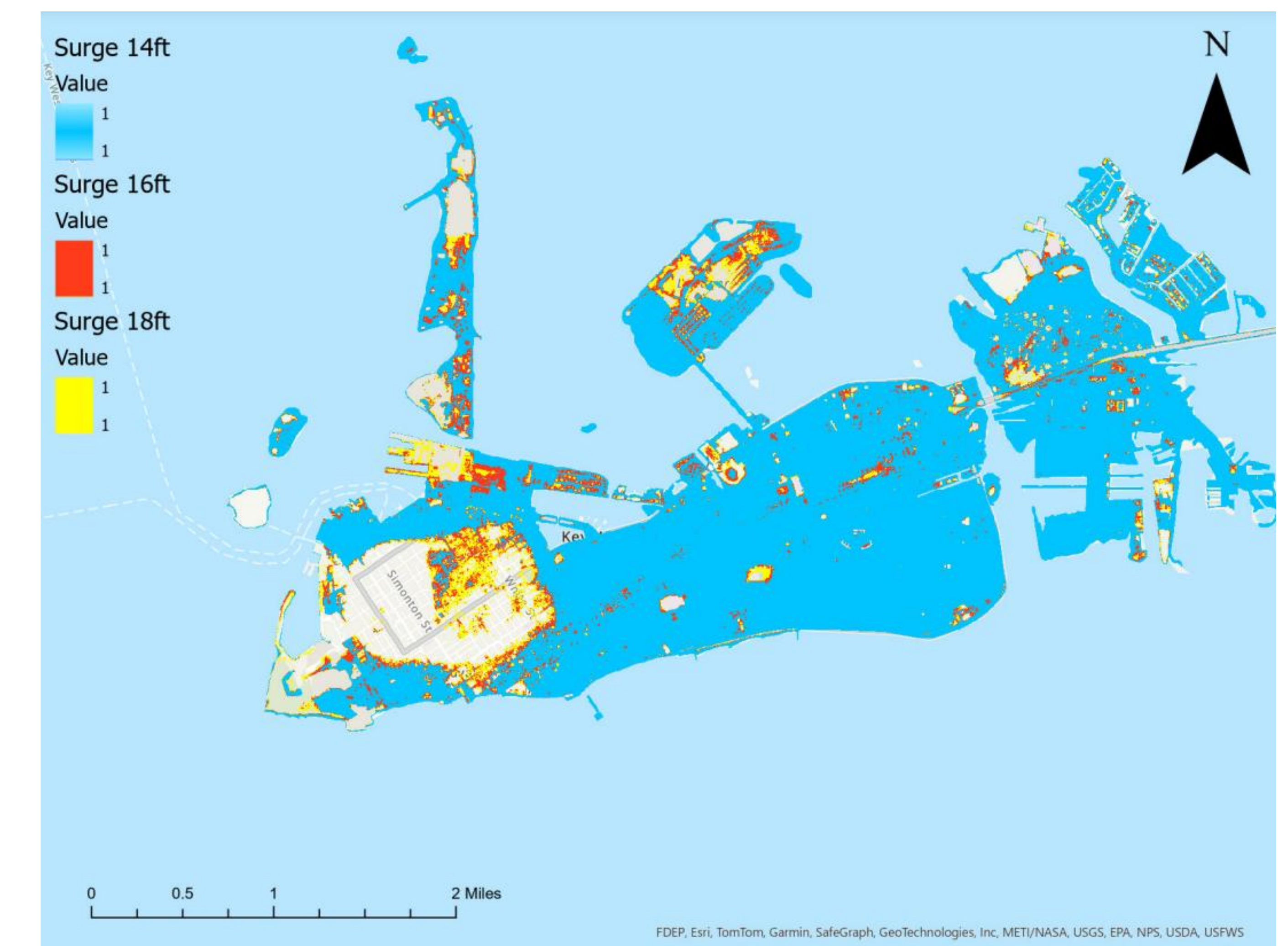
## Wind Field of Emilio

- Small compact hurricane: Eye only 10 miles wide
- Hurricane force winds 40 miles
- Right quadrant eyewall: strongest part of a hurricane
- Winds move water from Florida bay onto Key West



## Storm Surge Models 14, 16 and 18 ft

14 ft of surge covers the eastern and coastal sections of the Key West. The city's islands are completely inundated. 16 ft of surge penetrates the western section while 18ft of surge causes the most inundation as it penetrates the western half of the city.



## Broader Impacts and Future Research

The city will be able to rebuild due to its tourism, real estate value and hurricane preparedness. Future research can involve NWS data that incorporate size, speed and direction of a hurricane into storm surge models. This research can be used for underprivileged coastal communities. It can help create better flood zones, stricter building codes and greater hurricane awareness.