Communicating the Risk of Tropical Storm Surge to the Public in Charleston, SC

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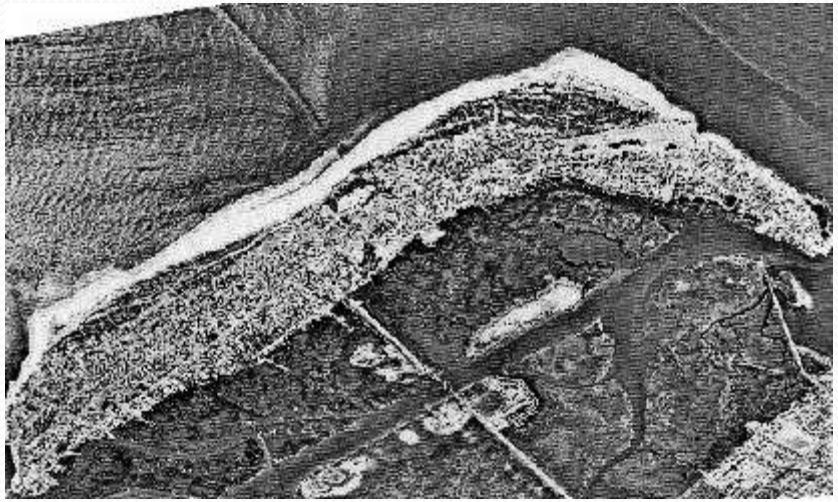
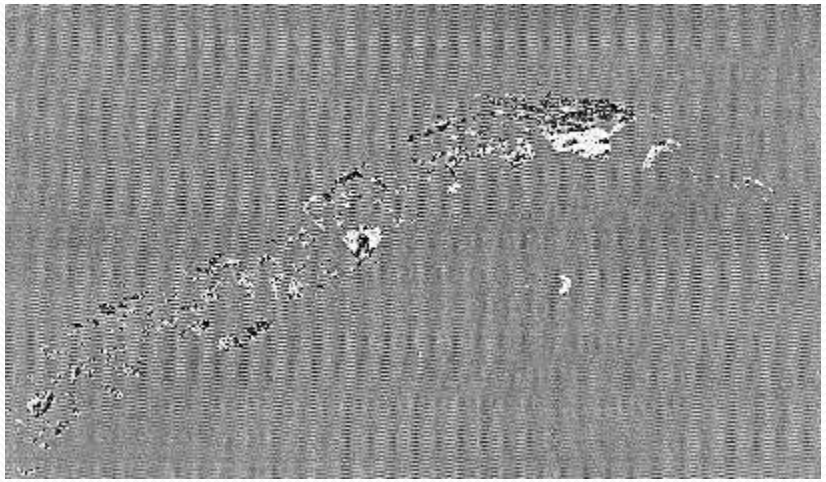
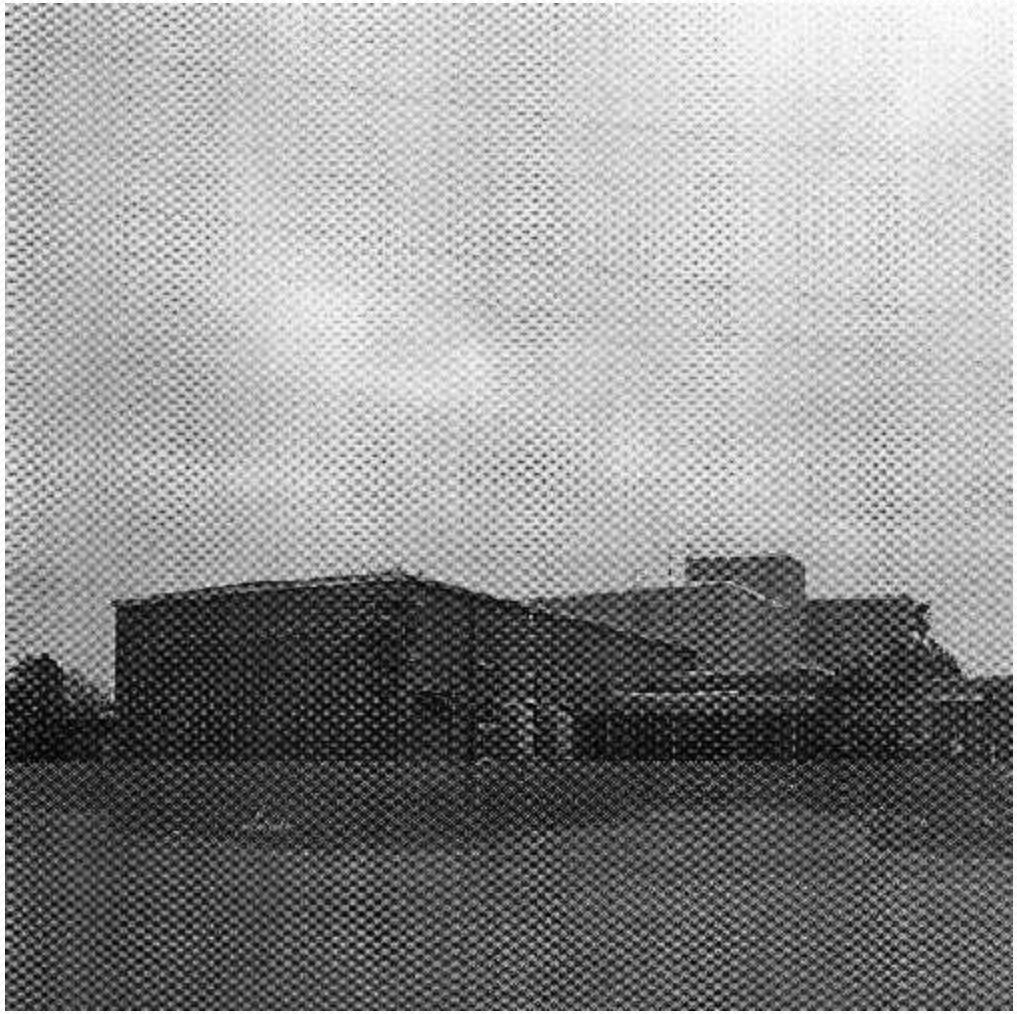
Background

- CHARLESTON HAS EXPERIENCED MANY HITS OR NEAR MISSES IN THE PAST 20 YEARS
- 93% OF OUR 202 SURVEY SUBJECTS HAD EXPERIENCED HURRICANE EFFECTS
- YET, MOST FAILED TO UNDERSTAND BASIC HURRICANE ADVISORIES
- HALF DID NOT REALIZE STORM SURGE IS THE MAIN THREAT
- MOST HAD NO CLUE WHAT A PARTICULAR SURGE DEPTH MEANT RELATIVE TO THEIR HOME ELEVATION
- MOST DID NOT HAVE AN EVACUATION PLAN
- HALF FELT THE NWS OVERSTATES THE DANGERS

Sullivan's Island, SC



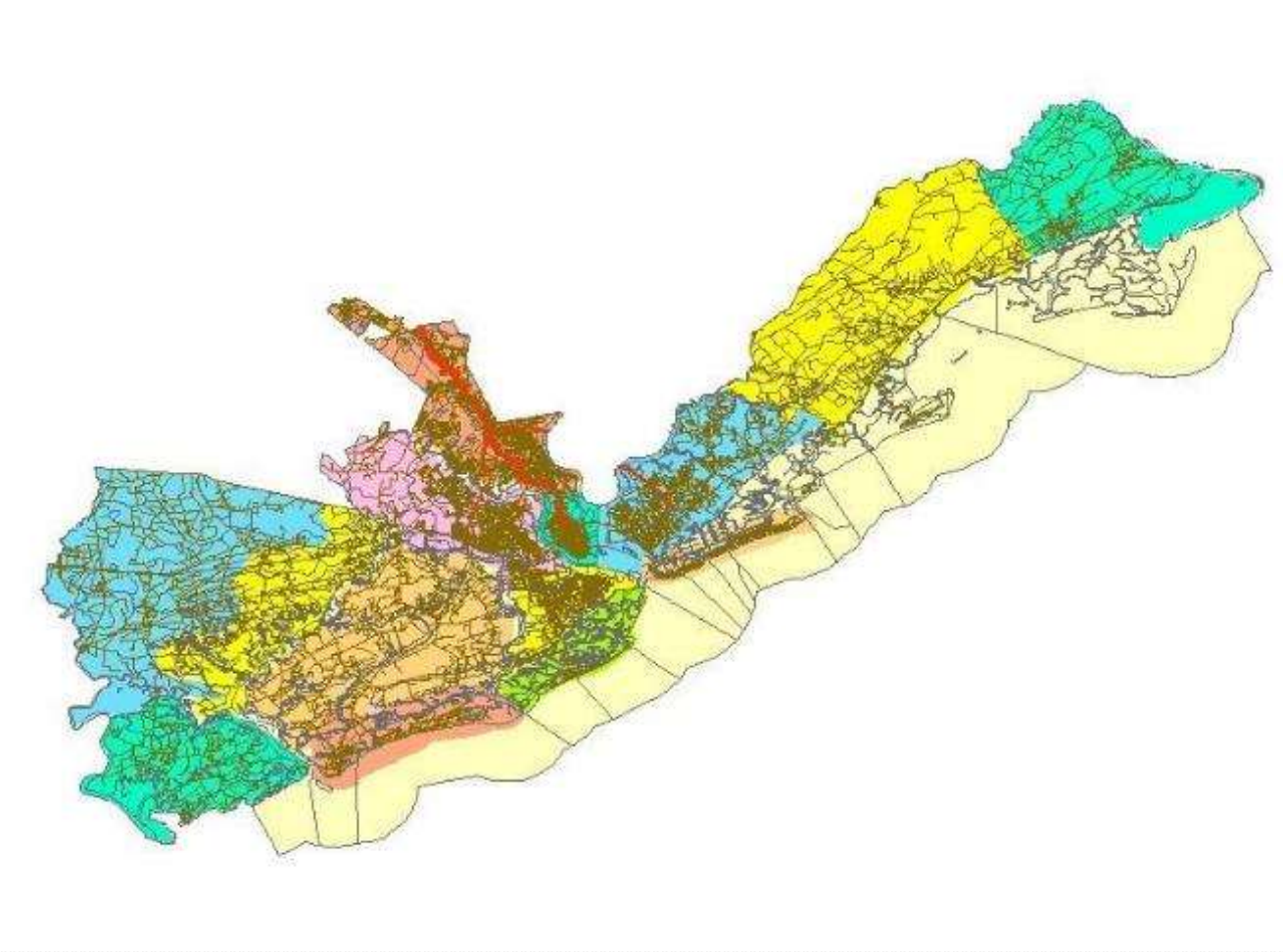




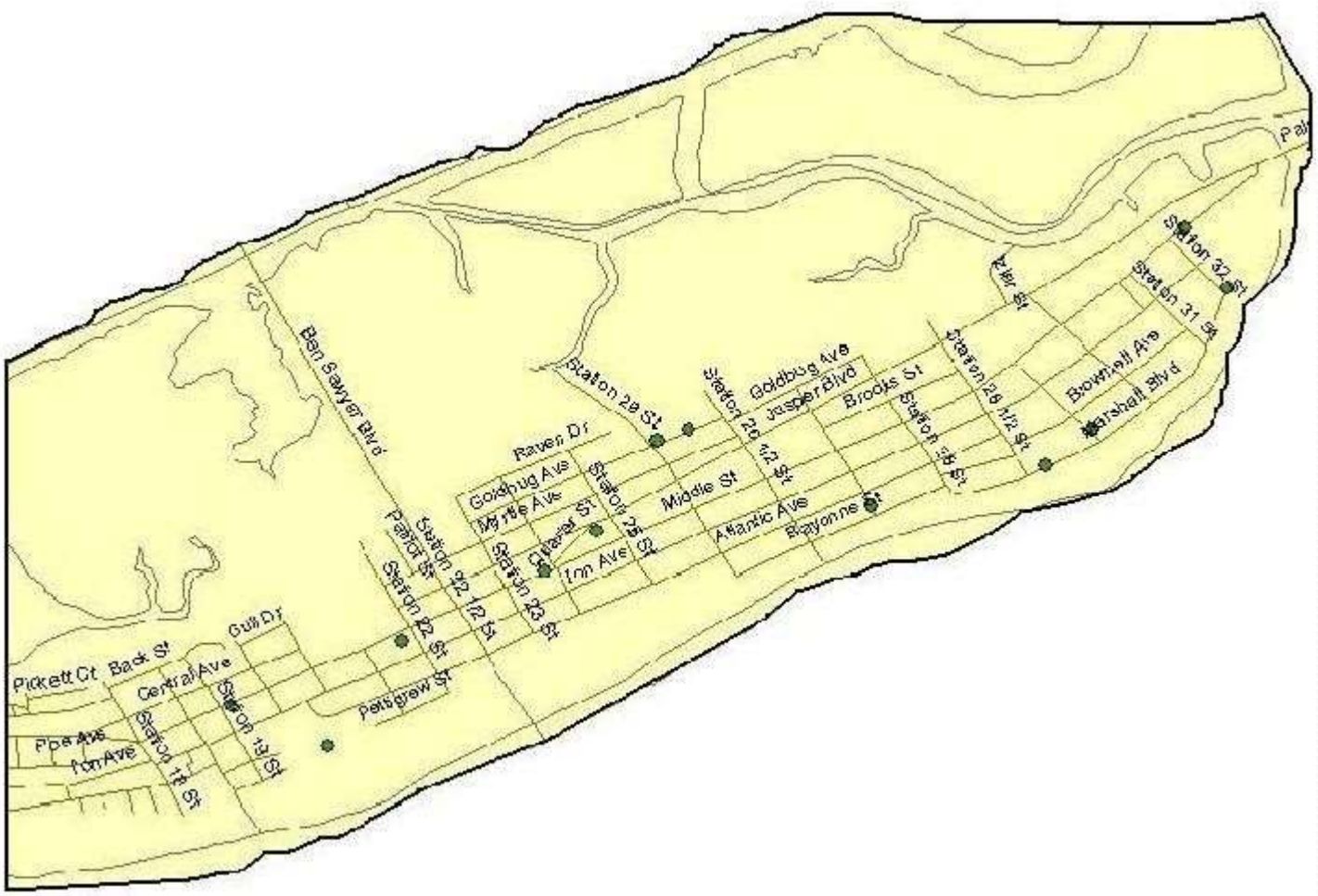
Surge Visualization Model

- INTERACTIVE WEB SITE
  - Background on Study
  - Basic Hurricane Physics
  - Hurricane Surge Visualization Model
  - Error Warnings
- DATA ON ONE THOUSAND LANDMARKS (every 2 blocks)
- DATABASE OF 50 SLOSH SIMULATIONS (Thanks Brian Jarvinen)
- COMBINE SLOSH, ELEVATION, TIDAL DATA
- OVERLAY WATER DEPTH ON PHOTOGRAPHS

GIS map, Charleston County



Zoom to Sullivan's Island



Palm Blvd. and 10th Ave.
Location Type: Landmark
Storm Category: 1

High Tide

Low Tide

Approximate Landfall Location

- McClellanville, SC (North)
- Charleston, SC (Direct)
- Edisto Beach, SC (South)

Show Landfall Locations

Category 1
Category 2
Category 3
Category 4
Category 5

Return to Map or Take Final Survey

Palm Blvd. and 10th Ave.
Location Type: Landmark
Storm Category: 2

High Tide

Low Tide

Approximate Landfall Location

McClellanville, SC (North)

Charleston, SC (Direct)

Edisto Beach, SC (South)

Show Landfall Locations

Category 1

Category 2

Category 3

Category 4

Category 5

Return to Map or Take Final Survey

Palm Blvd. and 10th Ave.
Location Type: Landmark
Storm Category: 3

High Tide

Low Tide

Approximate Landfall Location

McClellanville, SC (North)

Charleston, SC (Direct)

Edisto Beach, SC (South)

Show Landfall Locations

Category 1

Category 2

Category 3

Category 4

Category 5

Return to Map or Take Final Survey

Palm Blvd. and 10th Ave.
Location Type: Landmark
Storm Category: 3

Palm Blvd. and 10th Ave.
Location Type: Landmark
Storm Category: 5

Palm Blvd. and 10th Ave.
Location Type: Landmark
Storm Category: 5

High Tide

Low Tide

Approximate Landfall Location

McClellanville, SC (North)

Charleston, SC (Direct)

Edisto Beach, SC (South)

Show Landfall Locations

Category 1

Category 2

Category 3

Category 4

Category 5

Return to Map or Take Final Survey

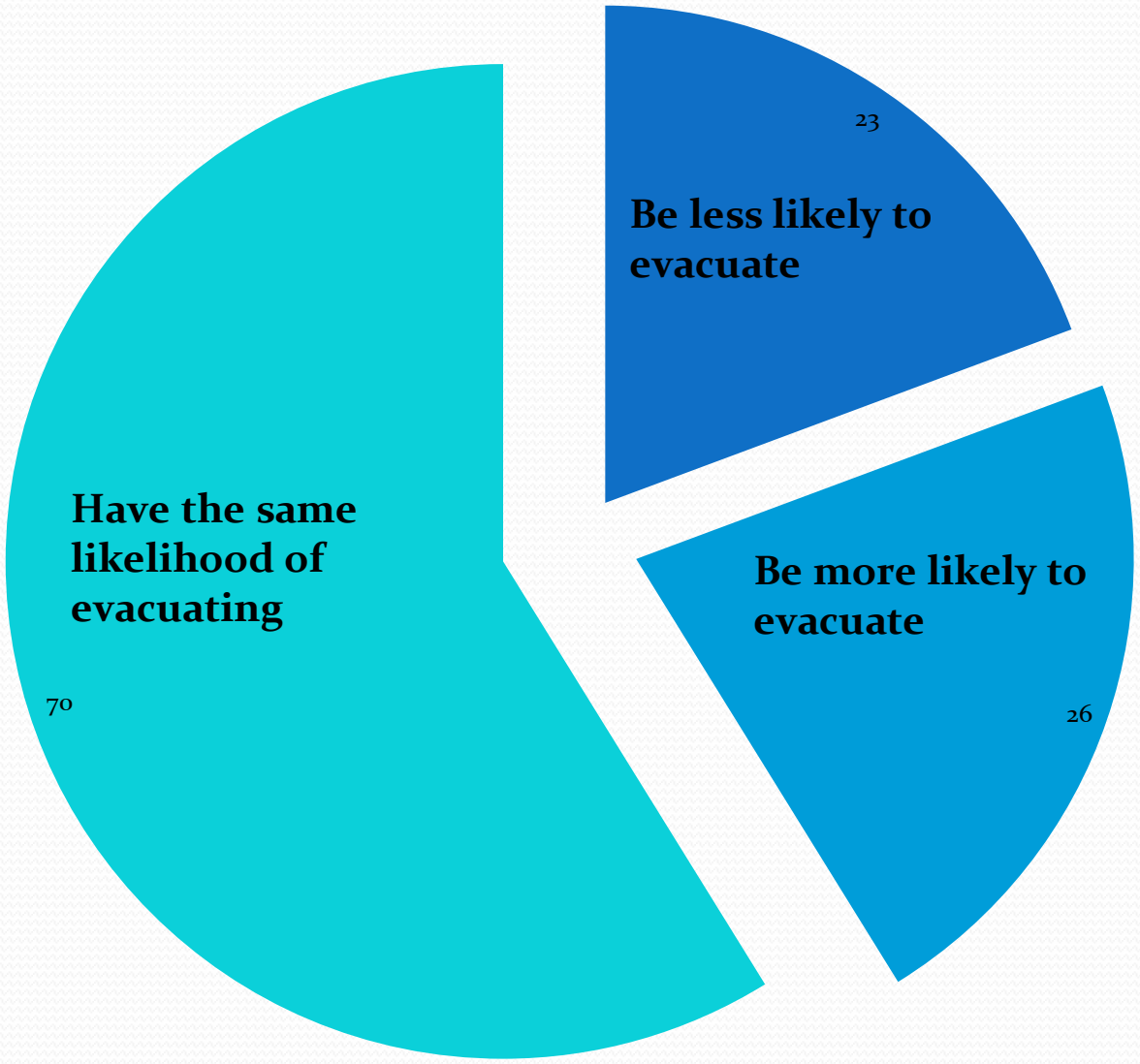
Survey Procedure

- SURVEY HUNDREDS OF RESIDENTS
- SITE ADDRESS ONLY RELEASED TO SURVEY SUBJECTS
- DEMOGRAPHICAL DATA
- UNDERSTANDING OF HURRICANE PHYSICS EXPLORED BEFORE AND AFTER USING THE SITE
- EXPLORE UNDERSTANDING OF UNCERTAINTIES IN FORECAST, ELEVATIONS, WAVES, INLAND FLOW, ETC.
- DETERMINE PROBLEM AREAS FOR FUTURE MODELS

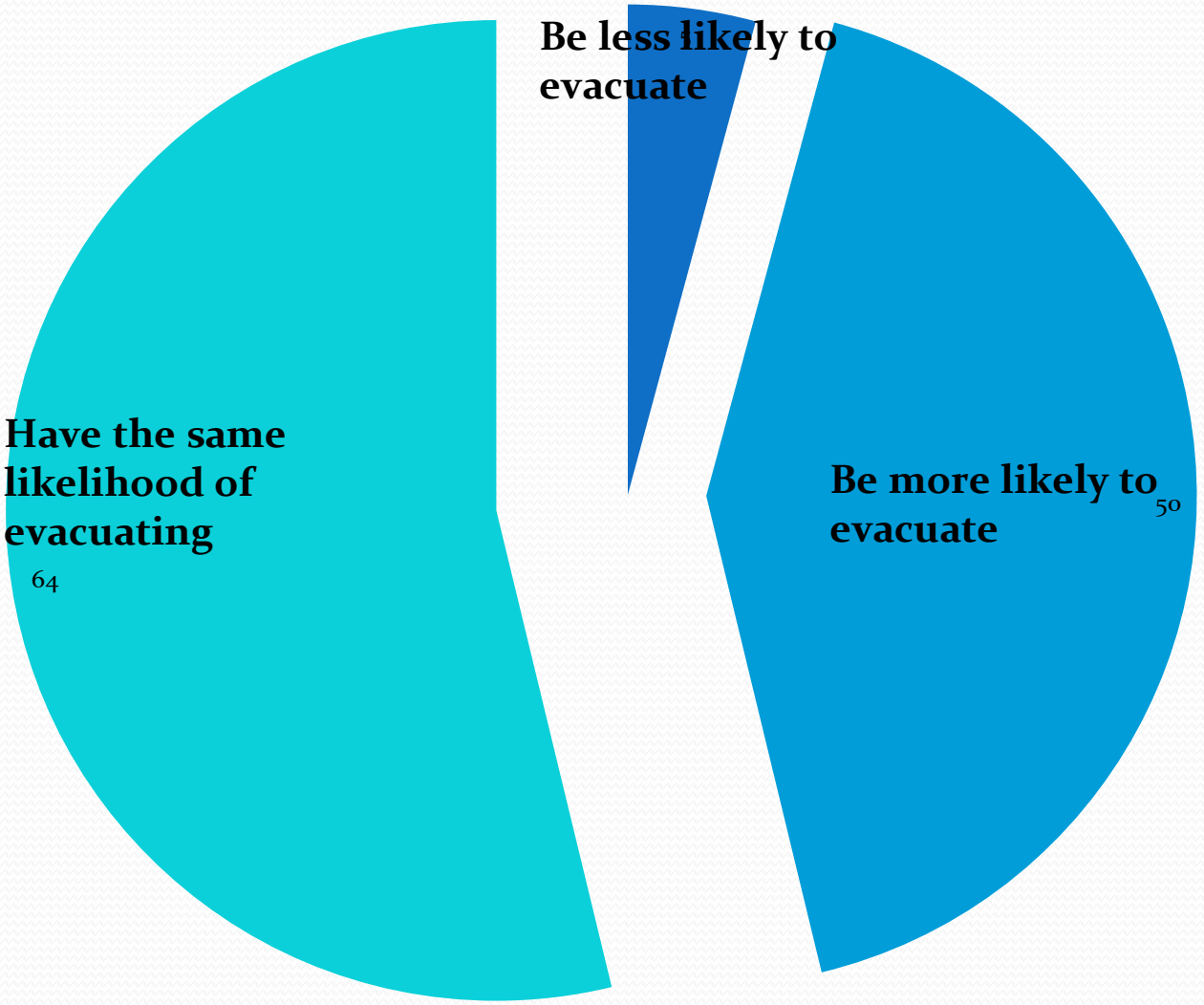
Subjects

- Interviewed by TV and radio broadcasters
- Featured in various newspapers
- Link on local NWS website
- About 600 respondents
- 120 (20%) did the second survey
- Mostly older, white, well-educated men
- Most had experience tropical storm effects

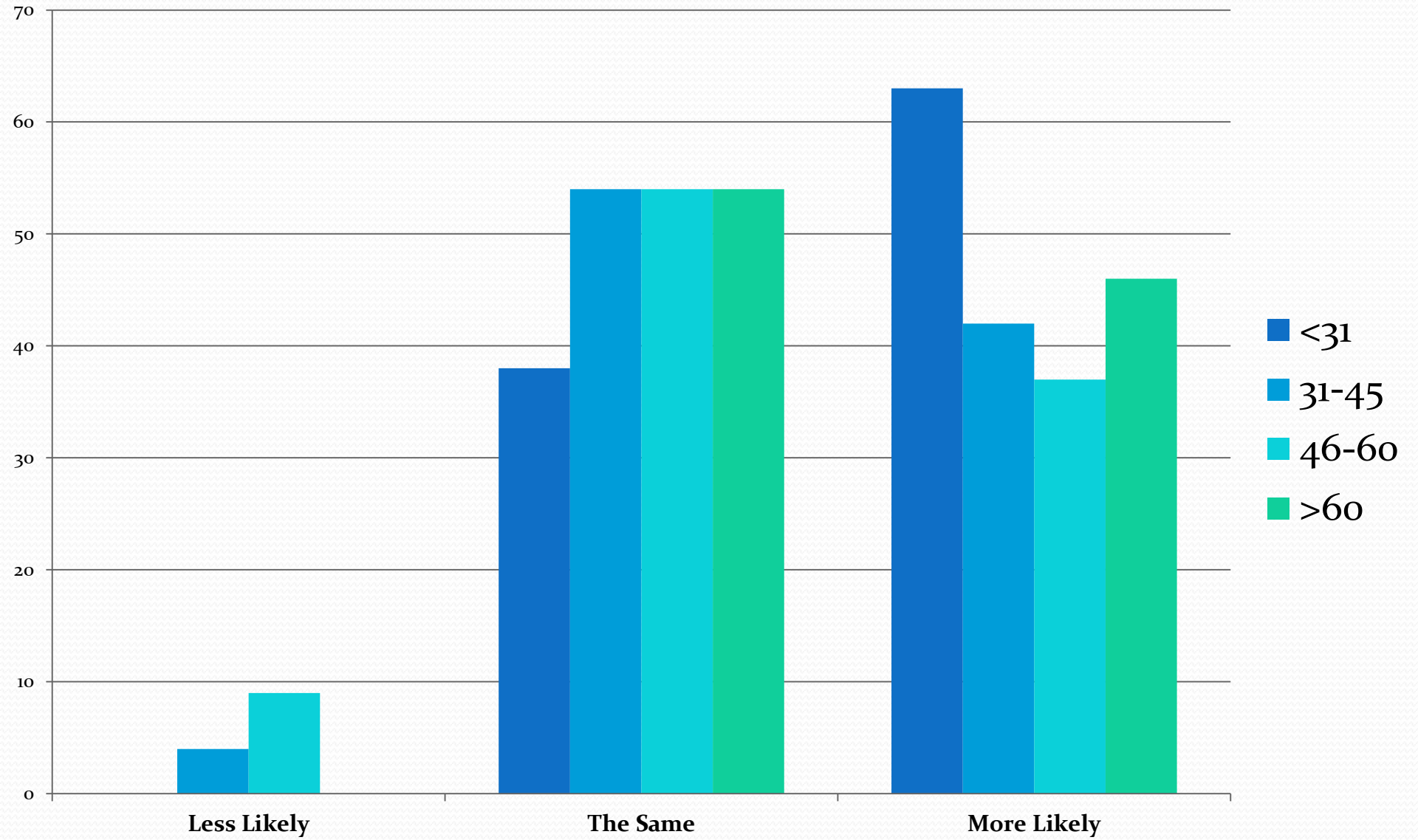
Now that you have explored our hurricane surge simulator, if a category 2 hurricane were projected to directly strike Charleston, would you now:



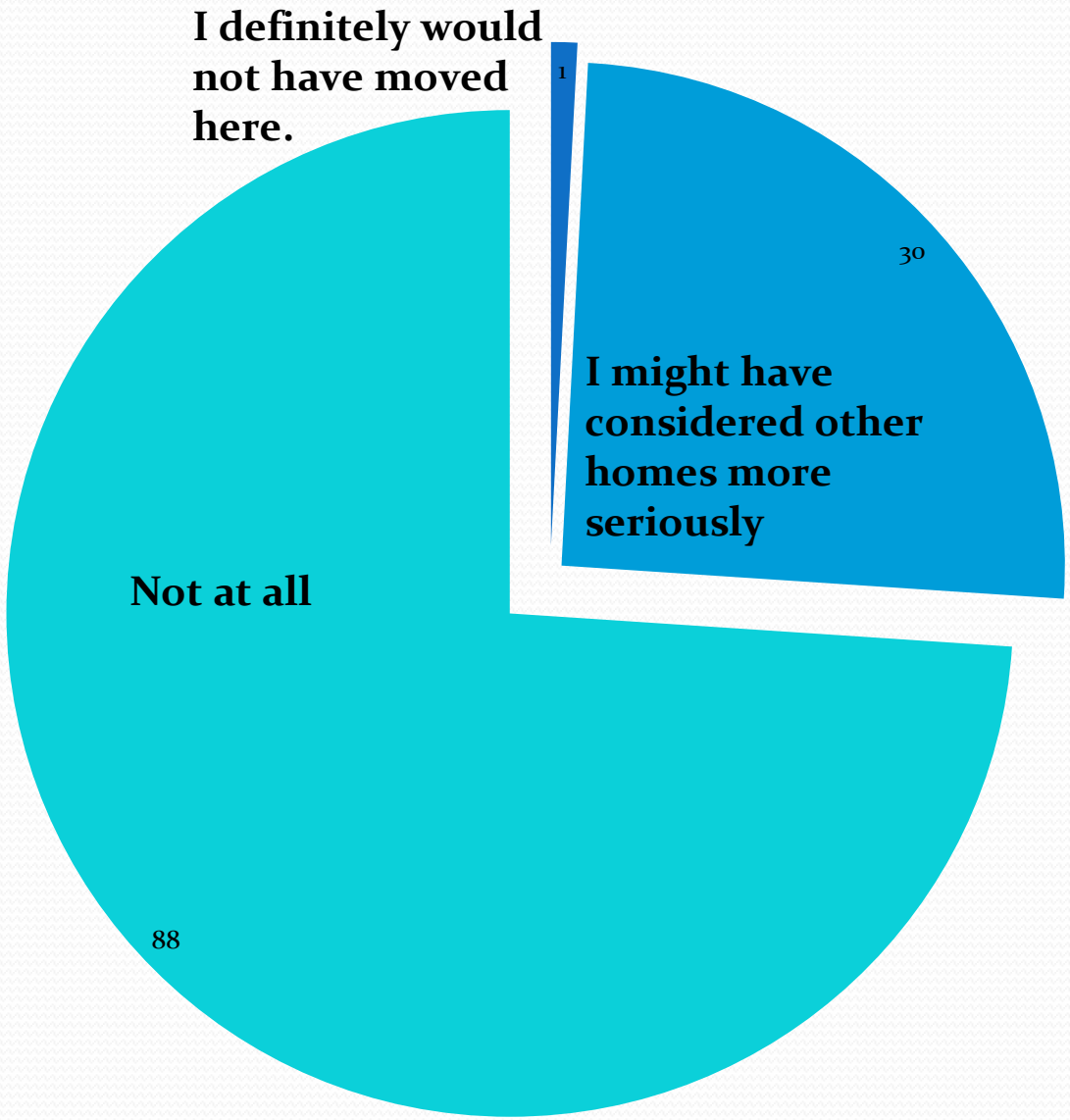
Now that you have explored our hurricane surge simulator, if a category 4 hurricane were projected to strike 20 miles south of Charleston, would you:



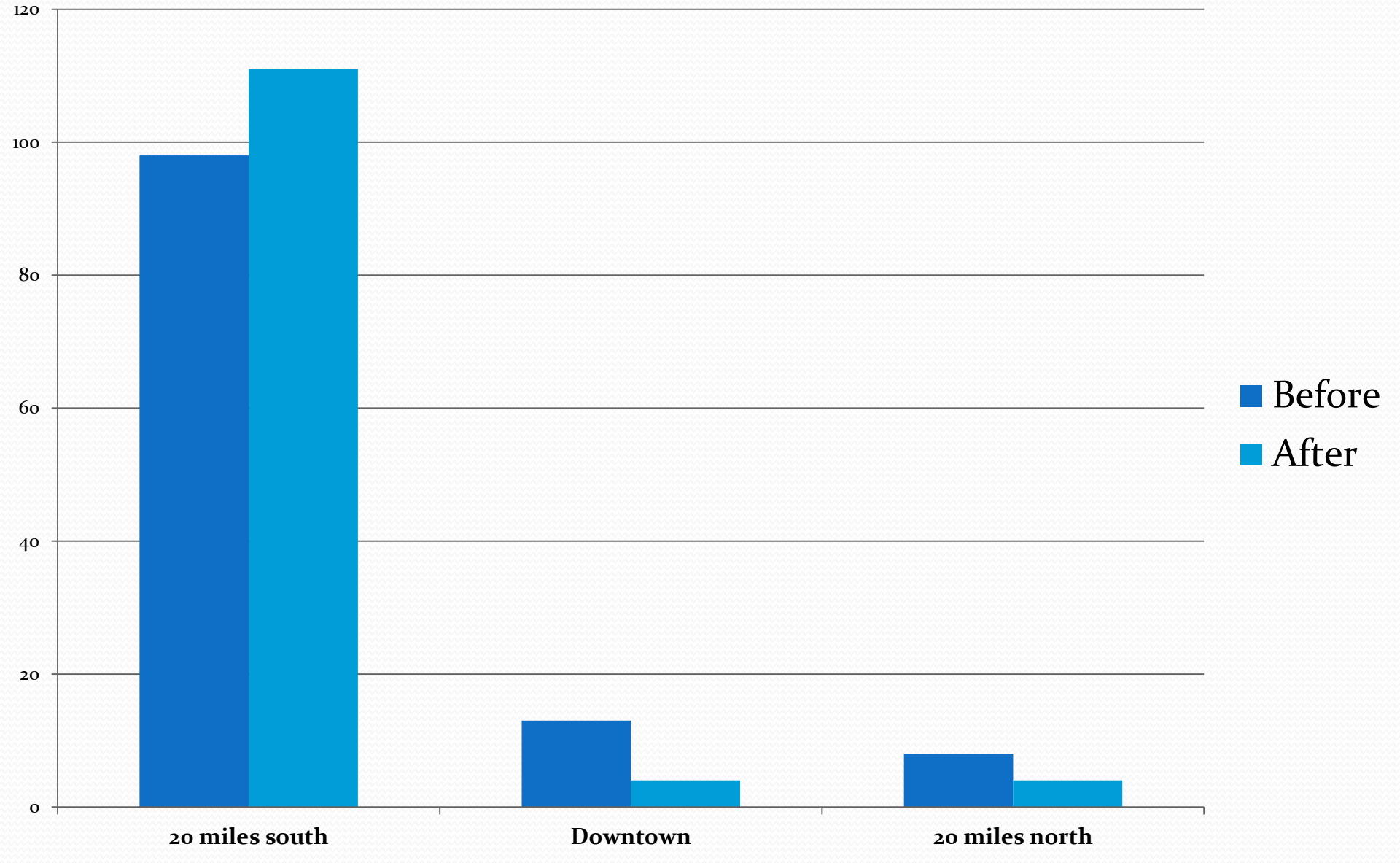
Now that you have explored our hurricane surge simulator, if a category 4 hurricane were projected to strike 20 miles south of Charleston, would you be less likely to evacuate, not change your decision, or more likely to evacuate? (% of response) by Age Group



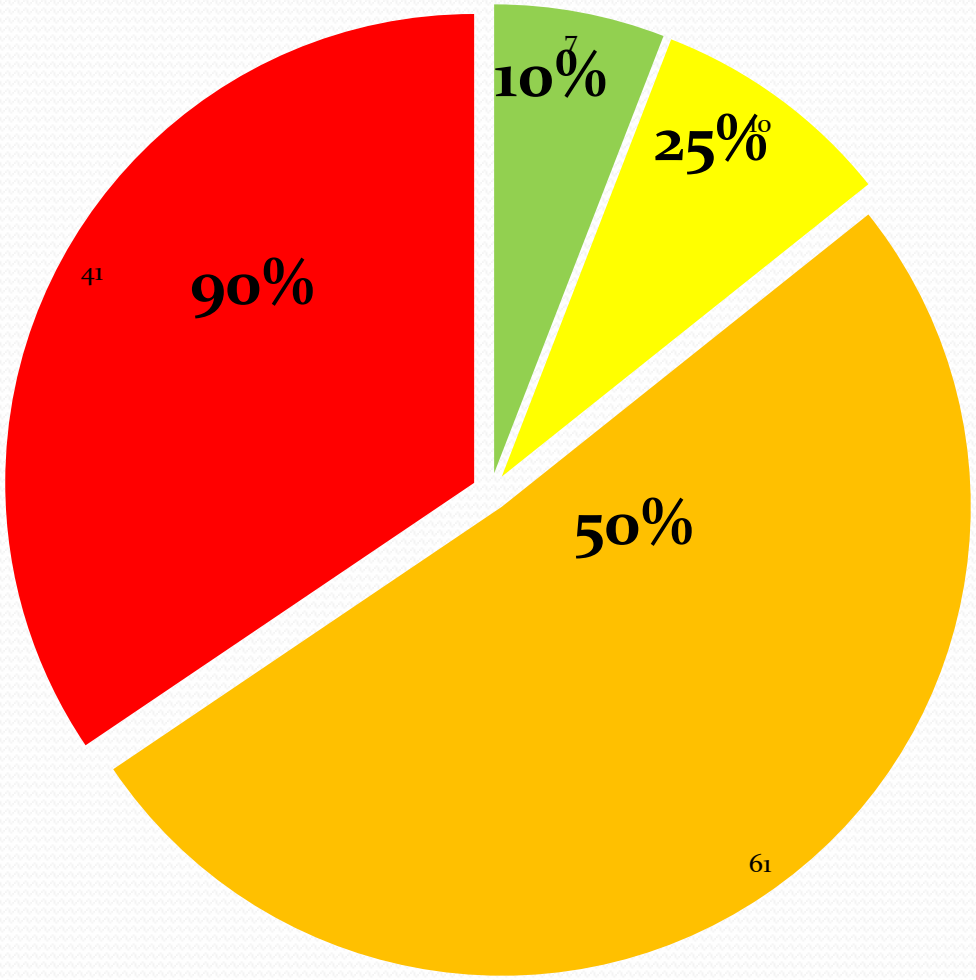
If you had access to this hurricane surge simulator prior to moving to your current home, would it have caused you to reconsider moving to your current home?



Which Produces the Most Storm Surge Flooding at your Home?

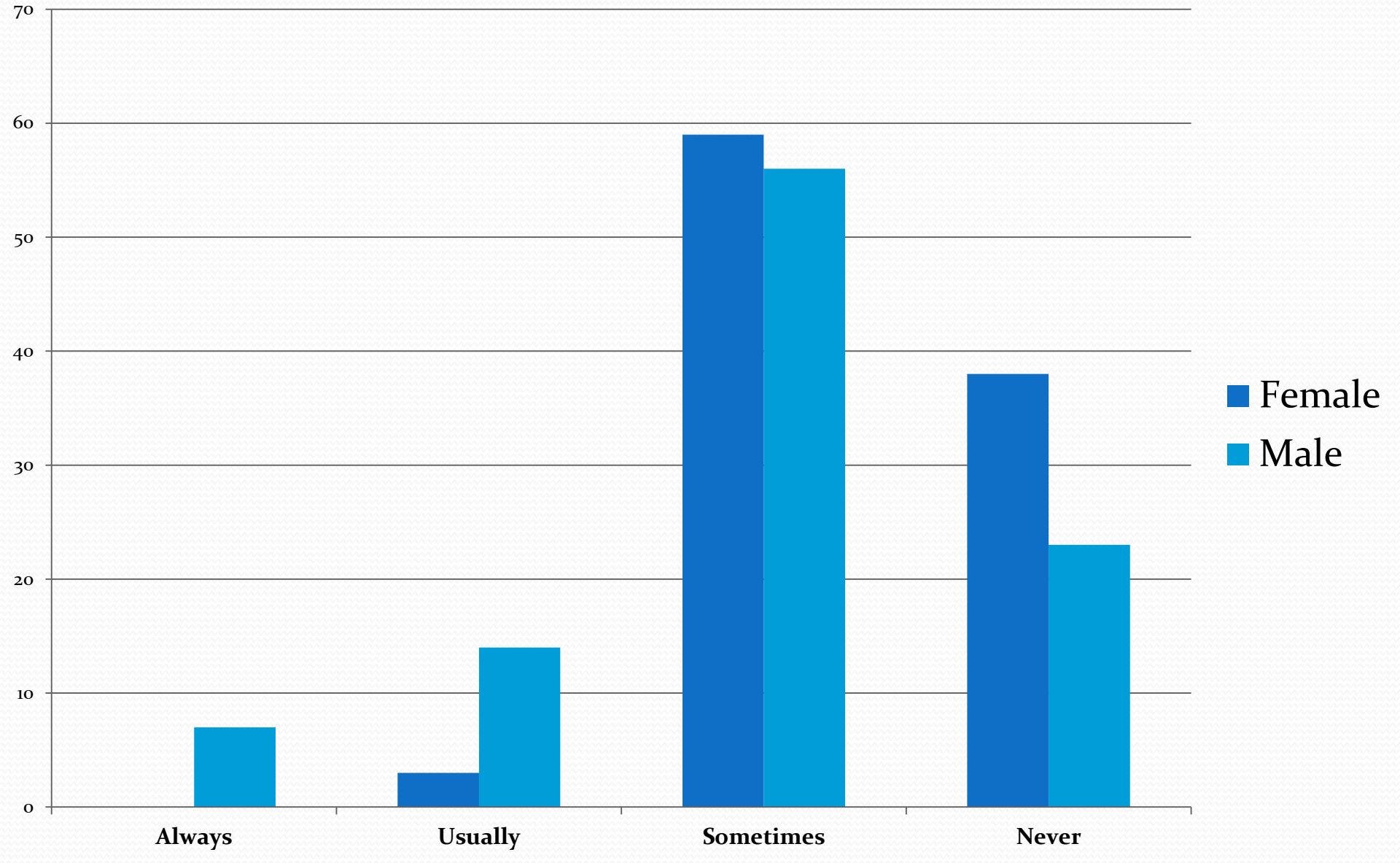


If the NWS predicts that a hurricane will pass directly over you in 3 days time, how often will it actually do so?

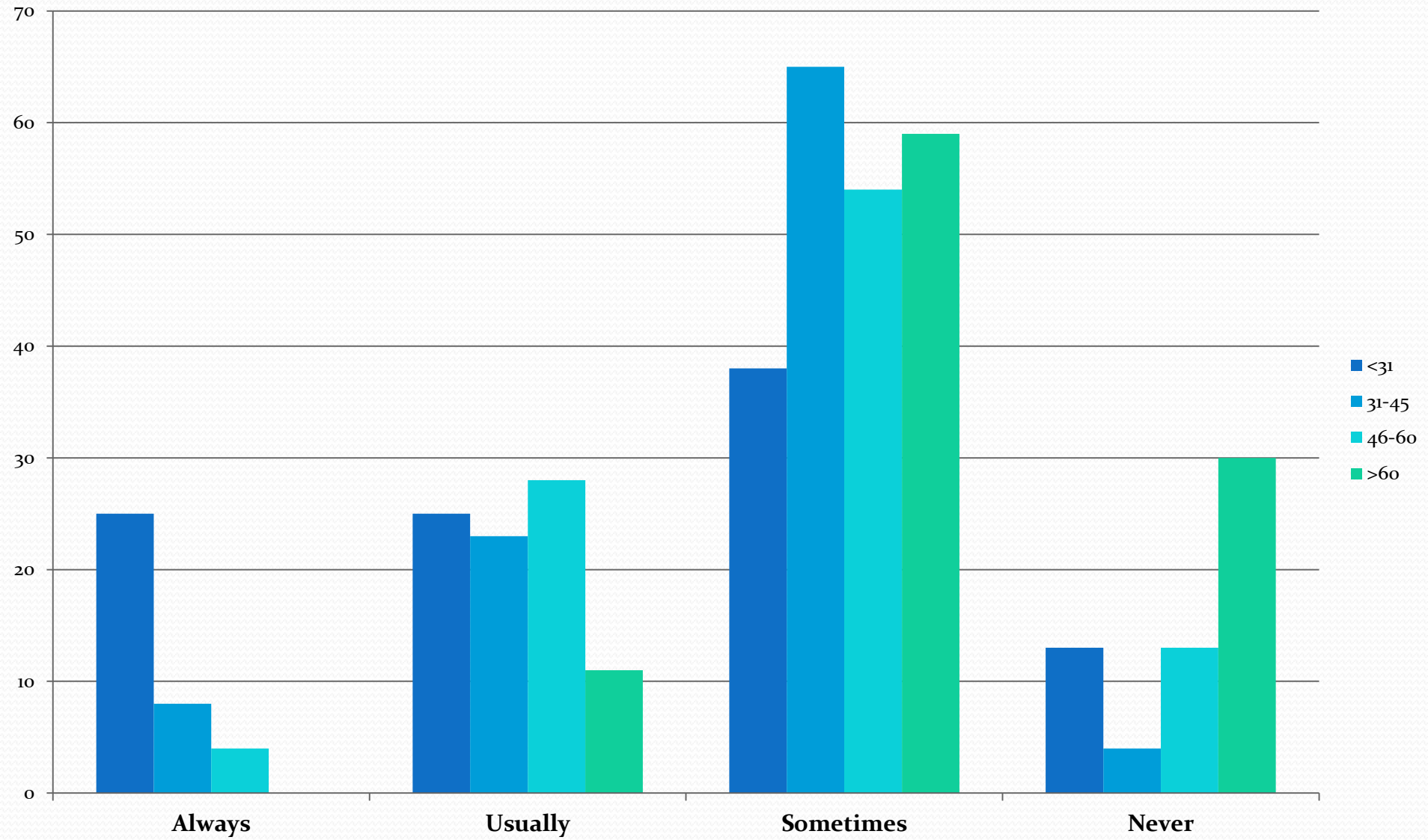


NOTE: The less than 5% option got zero

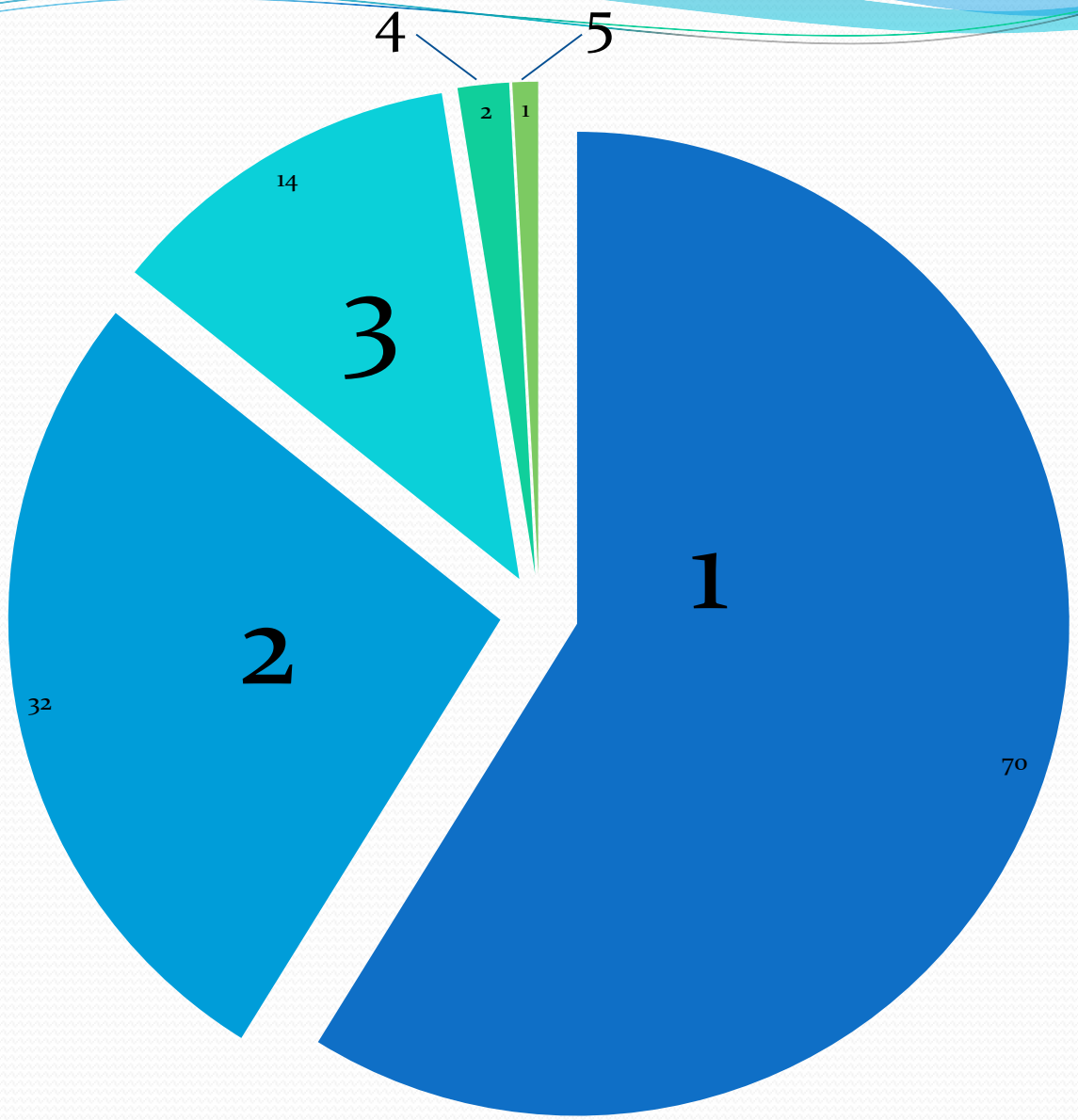
The National Weather Service Overstates the Dangers Associated with Hurricanes (% of responses) by Sex



The National Weather Service Overstates the Dangers Associated with Hurricanes (% of responses) by Age Group



Anxiety Level after Using Model (5 is highest)



Summary

- STANDARD FLOODZONE MAPS ARE NOT AS EFFECTIVE FOR MOST PEOPLE AS PHOTOS
- USERS MORE LIKELY TO EVACUATE (PARTICULARLY YOUNGER USERS)
- USERS LESS LIKELY TO OWN IN SURGE-PRONE AREAS
- BETTER UNDERSTANDING OF SURGE VARIABILITY
- NWS OVERSTATES DANGER BUT PREDICTS ACCURATELY
- THANKS TO THE NOAA (UCAR) COMET PROGRAM!

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