PROGRESS OVER THE PAST FIVE YEARS ON A HURRICANE SURGE VISUALIZATION MODEL AND FUTURE PLANS TO USE THE MODEL TO ASSESS PUBLIC UNDERSTANDING OF RISKS DUE TO STORM SURGE

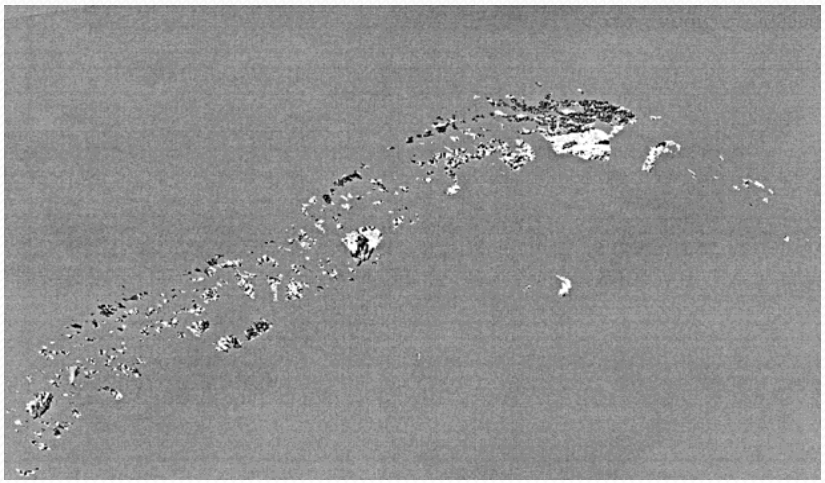
B. Lee Lindner, Stephen Duke, Janet Johnson
College of Charleston

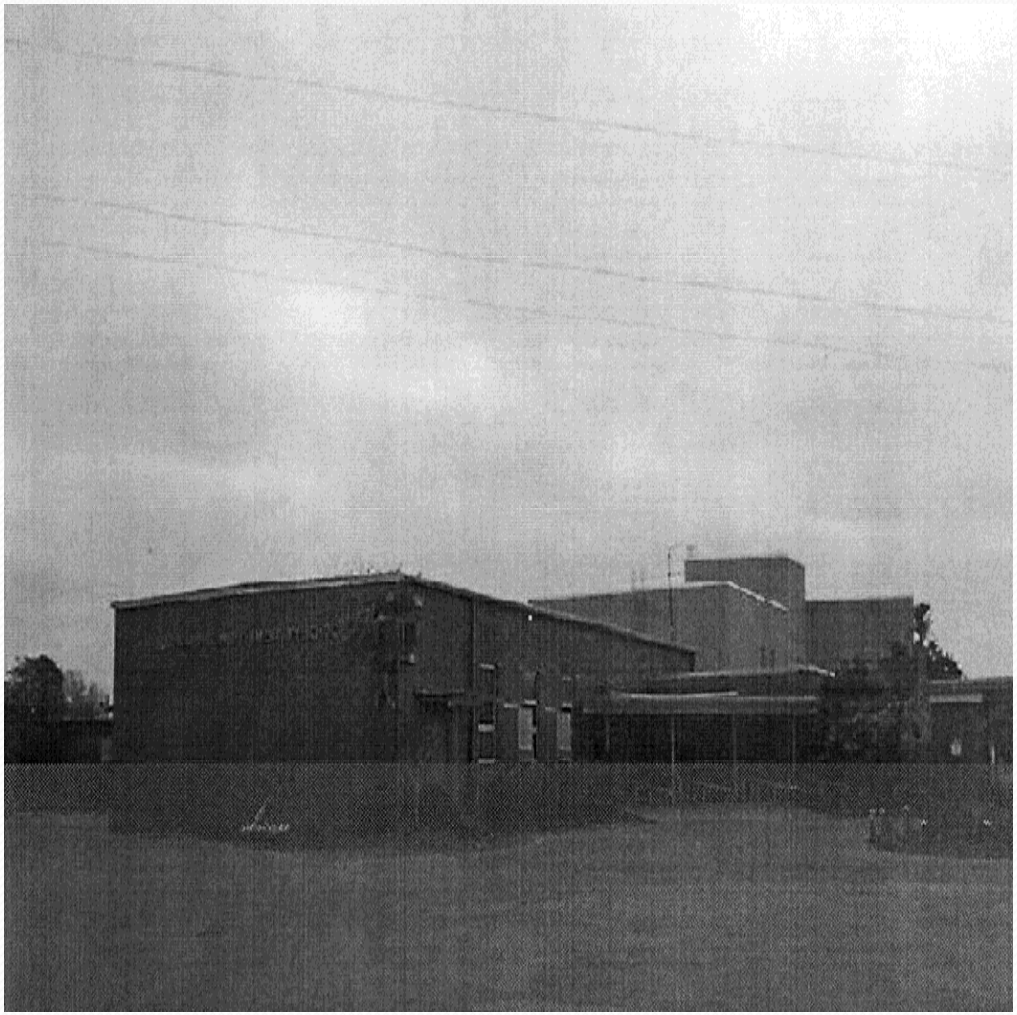
Frank Alsheimer and Robert Bright
National Weather Service, Charleston

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

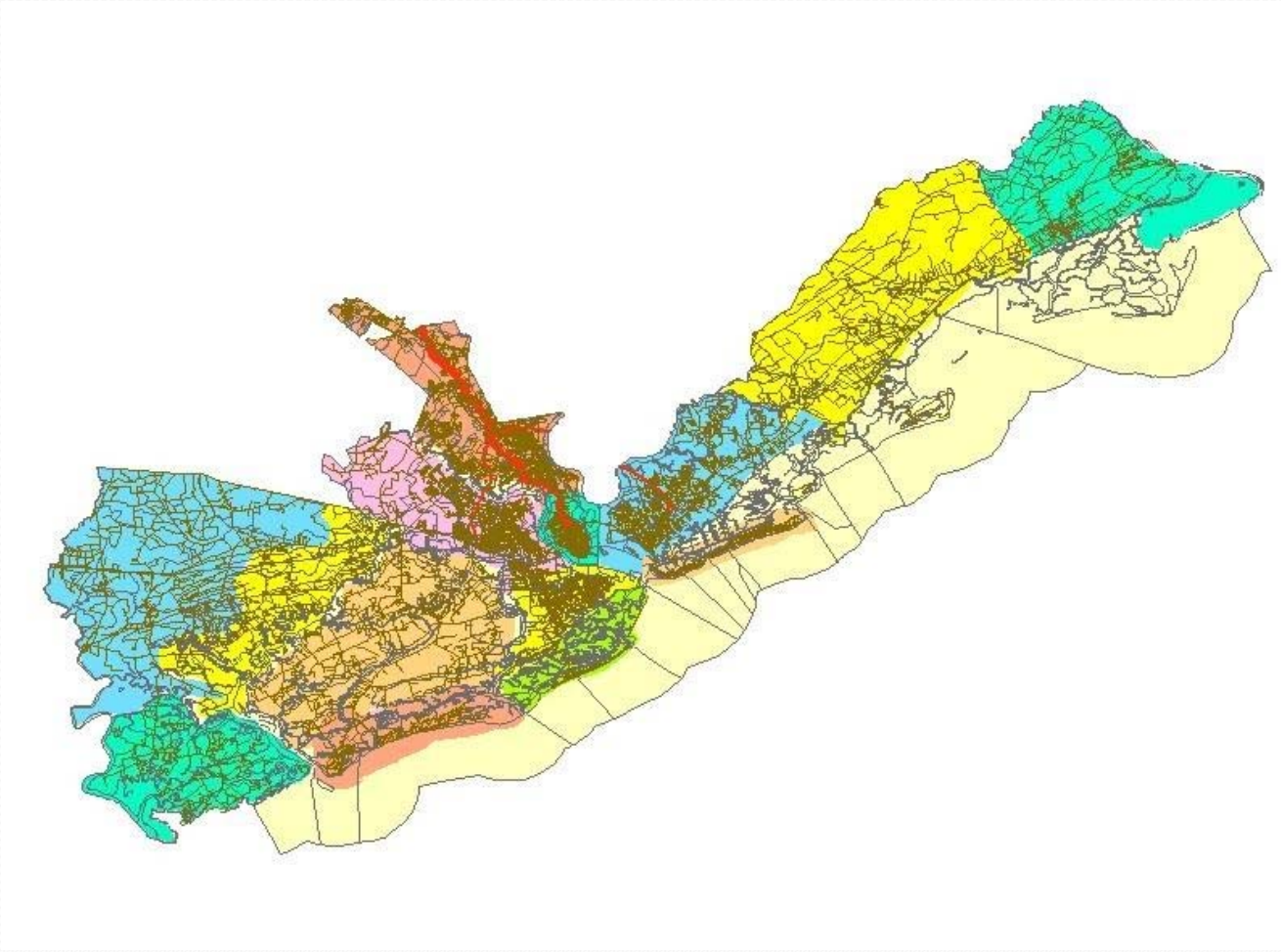




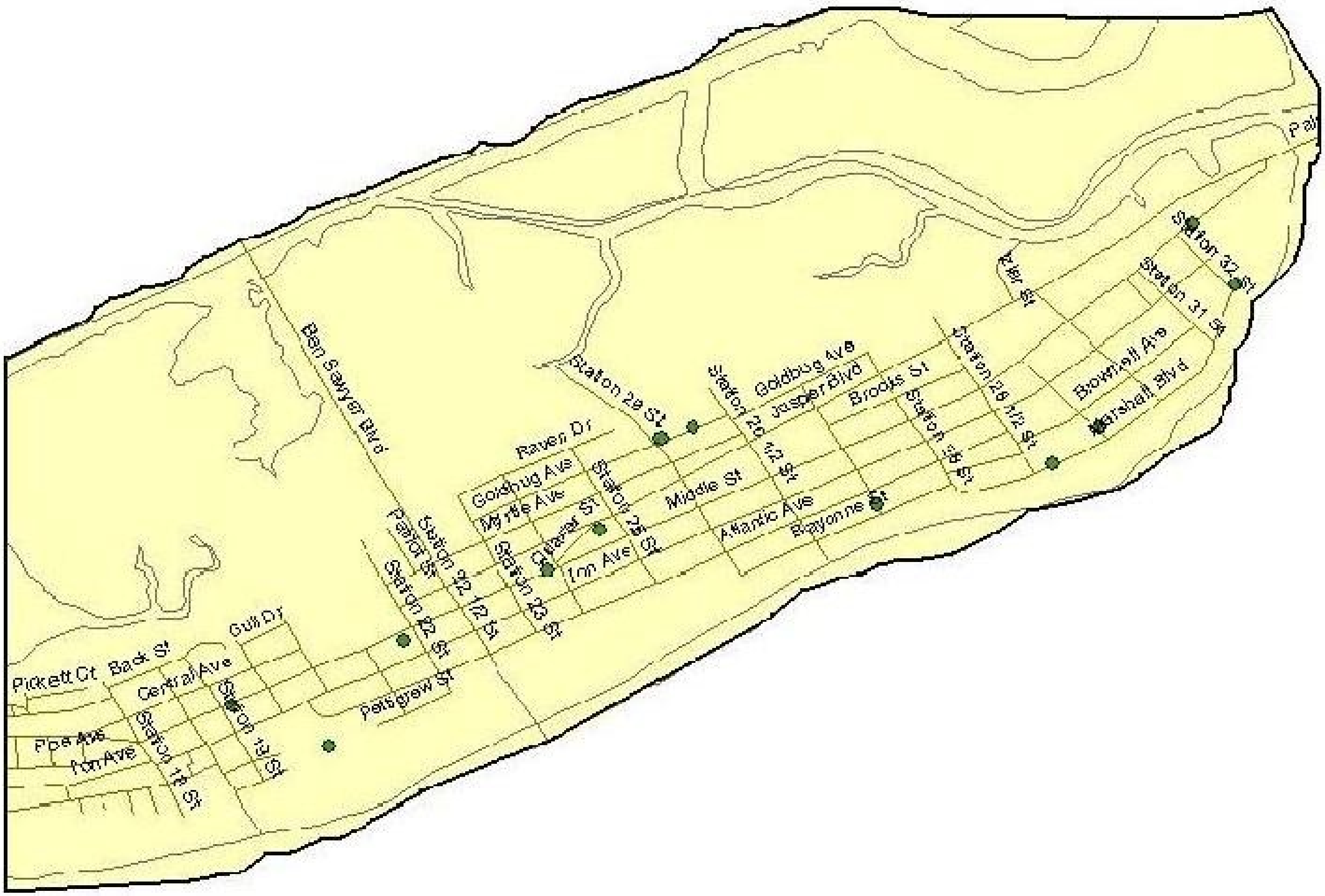
Surge Visualization Model

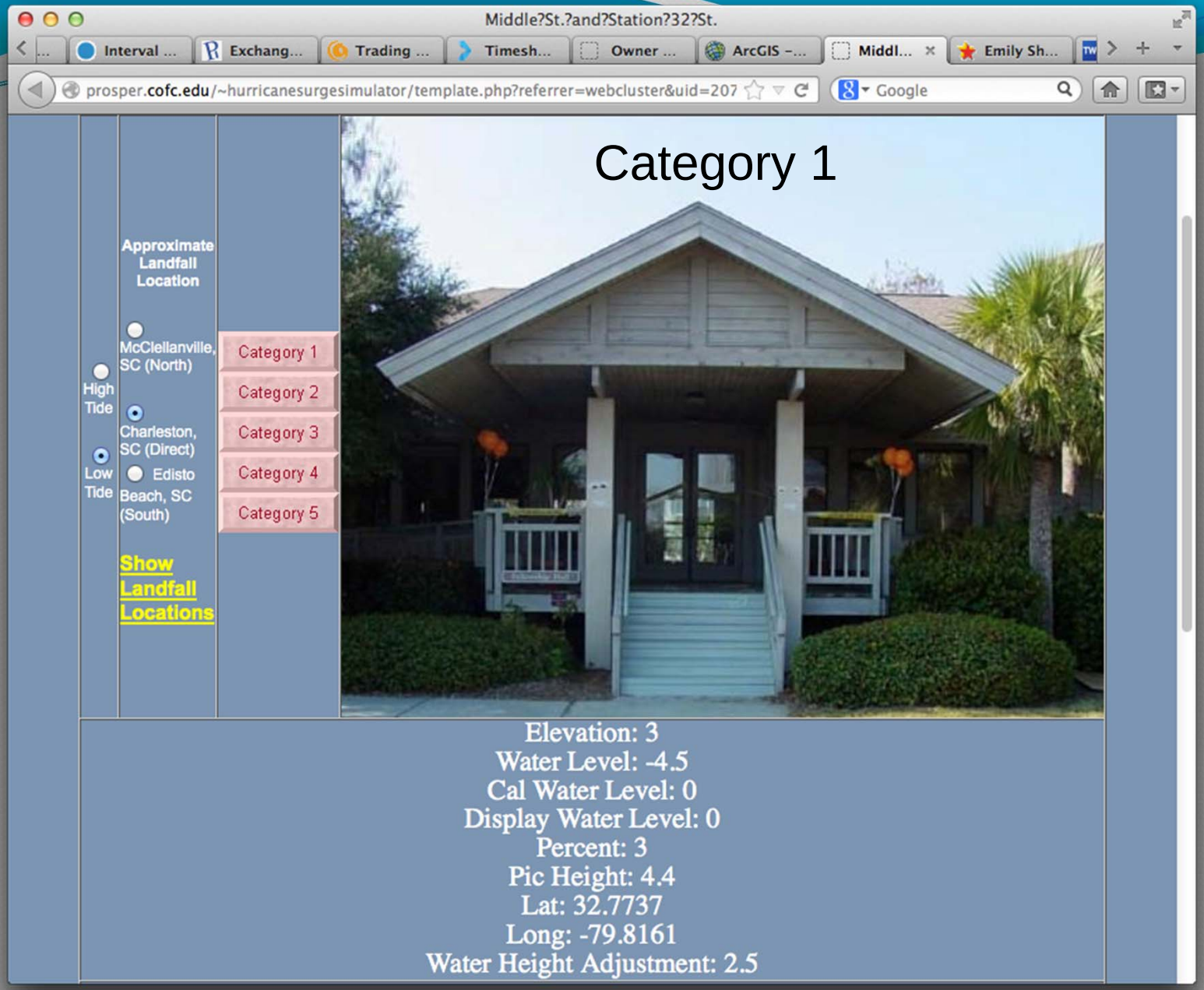
- INTERACTIVE WEB SITE
  - Background on Study
  - Basic Hurricane Physics
  - Hurricane Surge Visualization Model
  - Error Warnings
- DATA ON ONE THOUSAND LANDMARKS (every 2 blocks)
- DATABASE OF 50 SLOSH SIMULATIONS (Thanks Brian Jarvinen)
- COMBINE SLOSH, ELEVATION, TIDAL DATA
- OVERLAY WATER DEPTH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

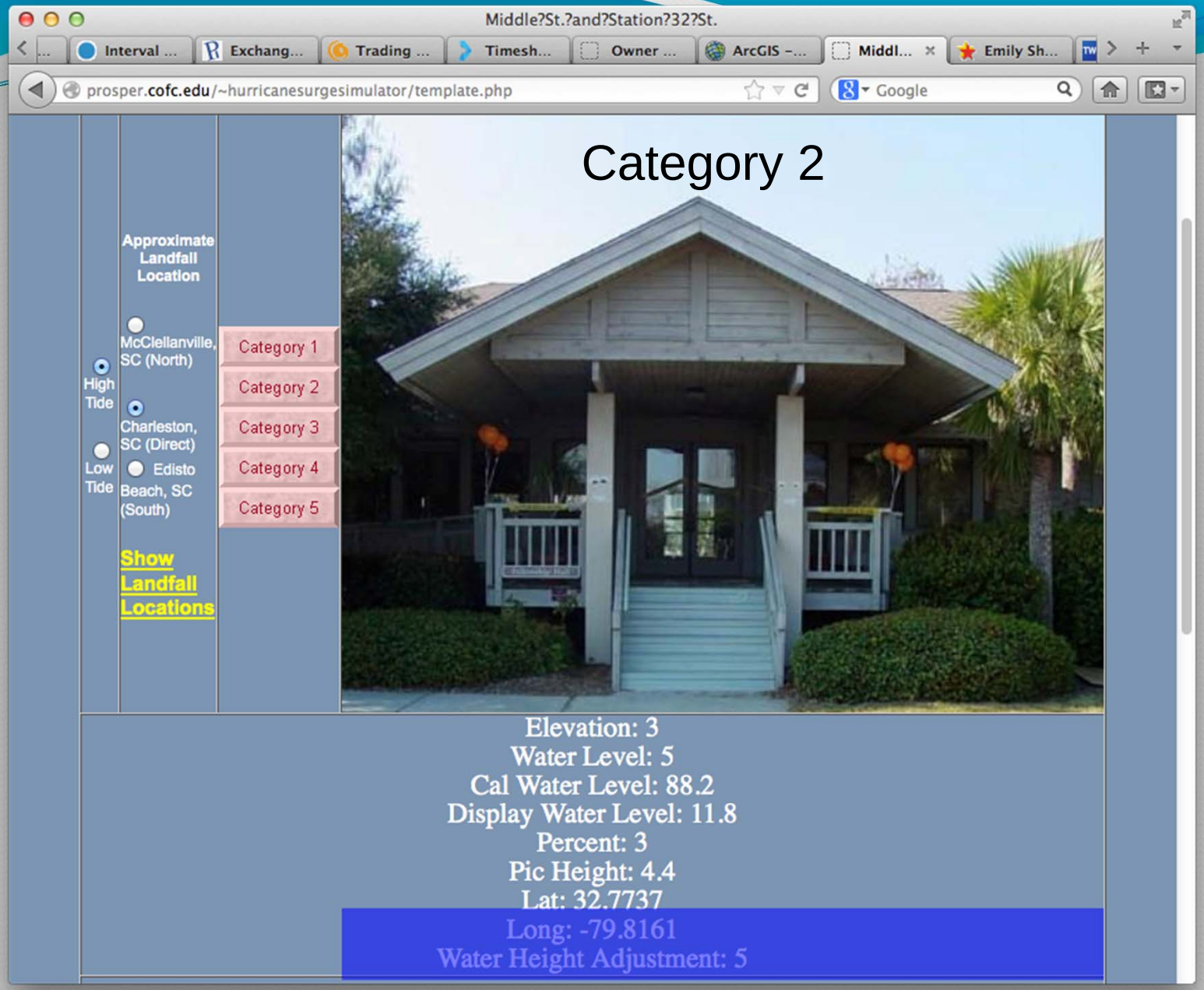
GIS map, Charleston County



Zoom to Sullivan’s Island




Middle?St.?and?Station?32?St.
Interval ...
Exchang...
Trading ...
Timesh...
Owner ...
ArcGIS -...
Middl...
Emily Sh...
prosper.cofc.edu/~hurricanesurgesimulator/template.php?referrer=webcluster&uid=207
Google
Approximate Landfall Location
McClellanville, SC (North)
Charleston, SC (Direct)
Edisto Beach, SC (South)
High Tide
Low Tide
Category 1
Category 2
Category 3
Category 4
Category 5
Show Landfall Locations
Category 1
Elevation: 3
Water Level: -4.5
Cal Water Level: 0
Display Water Level: 0
Percent: 3
Pic Height: 4.4
Lat: 32.7737
Long: -79.8161
Water Height Adjustment: 2.5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Google
Approximate Landfall Location
McClellanville, SC (North)
Charleston, SC (Direct)
Edisto Beach, SC (South)
High Tide
Low Tide
Category 1
Category 2
Category 3
Category 4
Category 5
Show Landfall Locations
Category 2
Elevation: 3
Water Level: 5
Cal Water Level: 88.2
Display Water Level: 11.8
Percent: 3
Pic Height: 4.4
Lat: 32.7737
Long: -79.8161
Water Height Adjustment: 5


Middle?St.?and?Station?32?St.
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Exchang...
Trading ...
Timesh...
Owner ...
ArcGIS –...
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Emily Sh...
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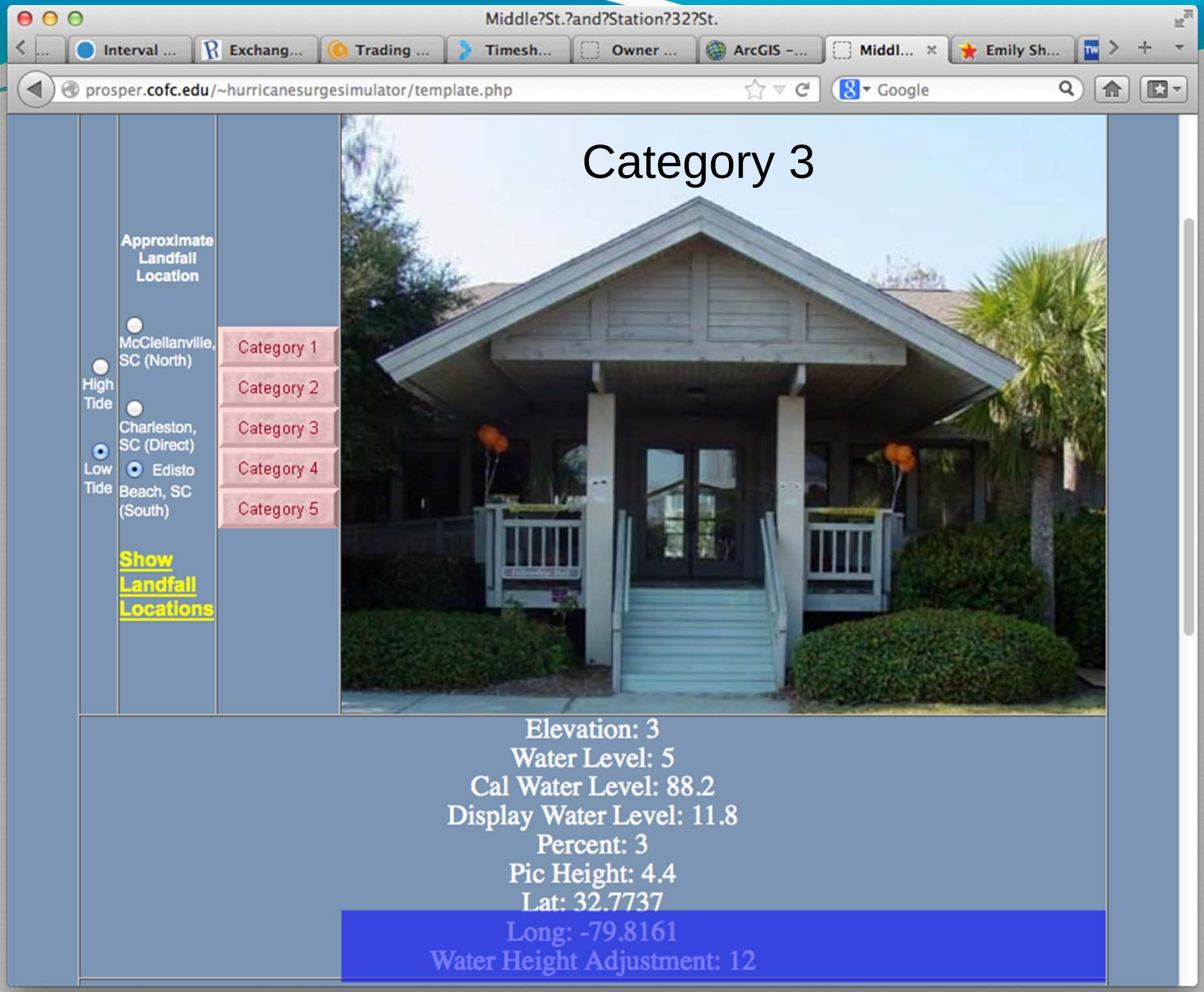
Google
Approximate Landfall Location
McClellanville, SC (North)
Charleston, SC (Direct)
Edisto Beach, SC (South)
High Tide
Low Tide
Category 1
Category 2
Category 3
Category 4
Category 5
Show Landfall Locations
Category 3
Elevation: 3
Water Level: 1
Cal Water Level: 105.8
Display Water Level: 0
Percent: 3
Pic Height: 4.4
Lat: 32.7737
Long: -79.8161
Water Height Adjustment: 8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Exchang...
Trading ...
Timesh...
Owner ...
ArcGIS -...
Middl...
Emily Sh...
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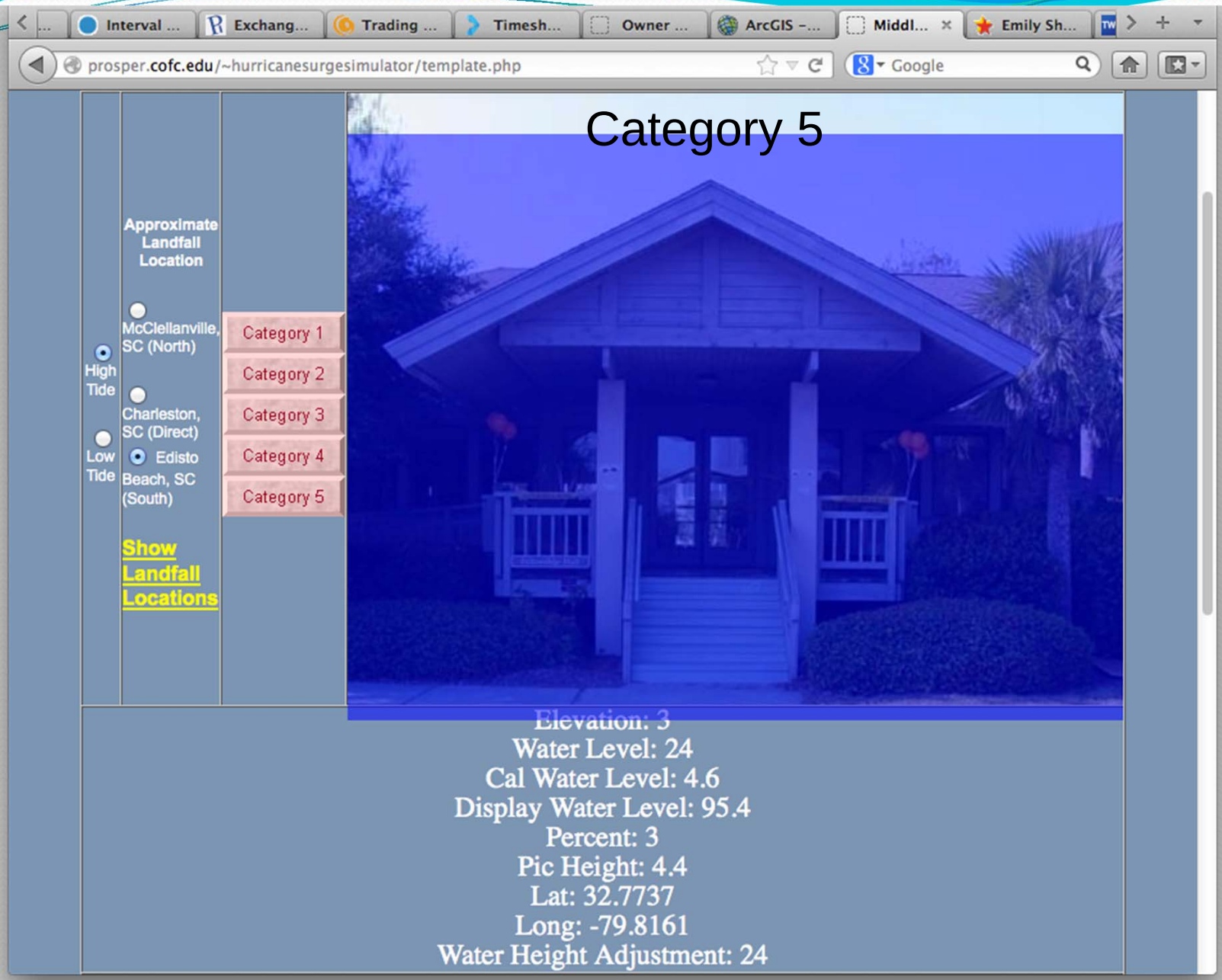
Google
Category 3
Approximate Landfall Location
McClellanville, SC (North)
Charleston, SC (Direct)
Edisto Beach, SC (South)
High Tide
Low Tide
Category 1
Category 2
Category 3
Category 4
Category 5
Show Landfall Locations
Elevation: 3
Water Level: 5
Cal Water Level: 88.2
Display Water Level: 11.8
Percent: 3
Pic Height: 4.4
Lat: 32.7737
Long: -79.8161
Water Height Adjustment: 12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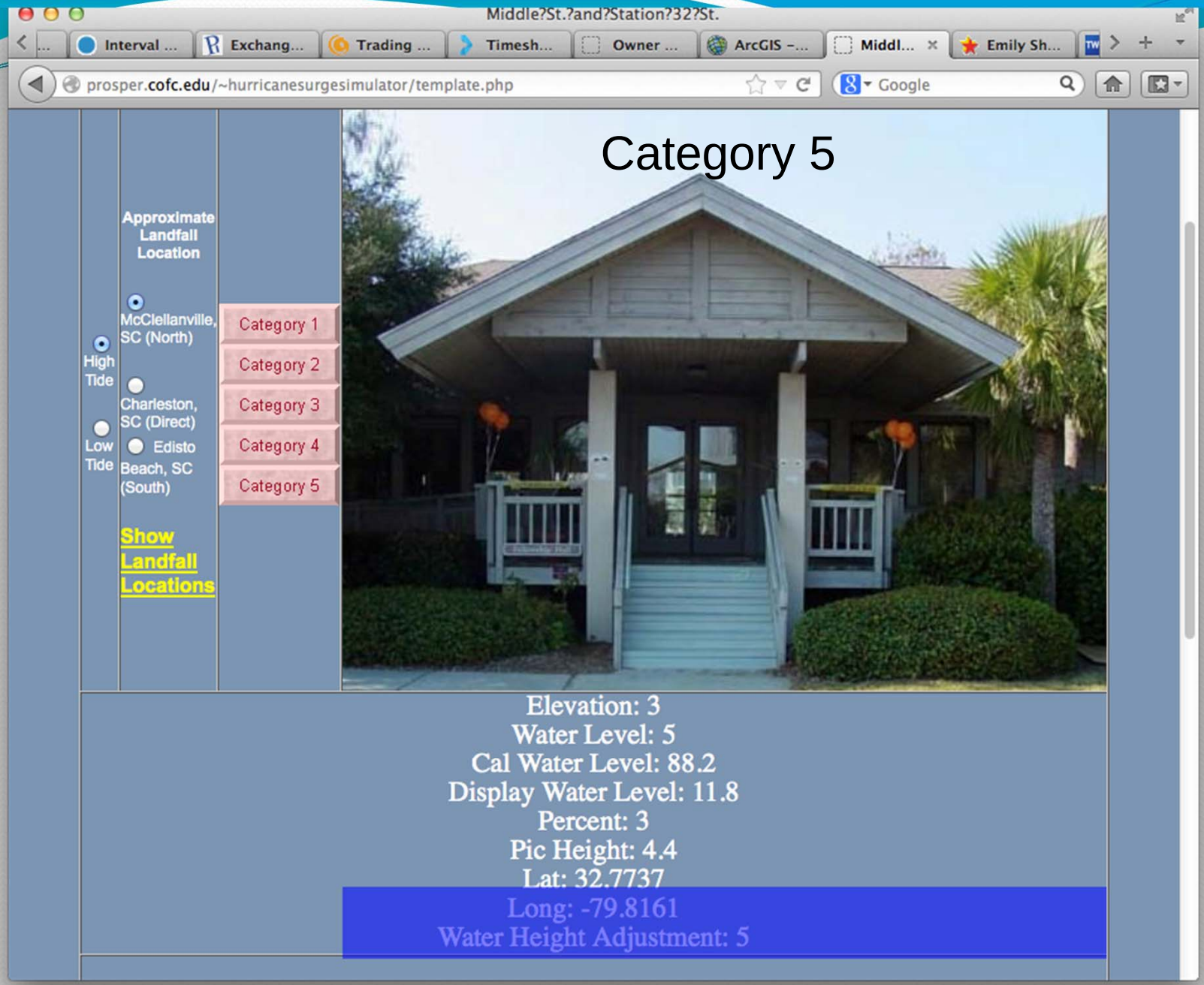
Timesh...
Owner ...
ArcGIS –...
Middl...
Emily Sh...
prosper.cofc.edu/~hurricanesurgesimulator/template.php
Google
Approximate Landfall Location
McClellanville, SC (North)
Charleston, SC (Direct)
Edisto Beach, SC (South)
High Tide
Low Tide
Category 1
Category 2
Category 3
Category 4
Category 5
Show Landfall Locations
Category 5
Elevation: 3
Water Level: 24
Cal Water Level: 4.6
Display Water Level: 95.4
Percent: 3
Pic Height: 4.4
Lat: 32.7737
Long: -79.8161
Water Height Adjustment: 24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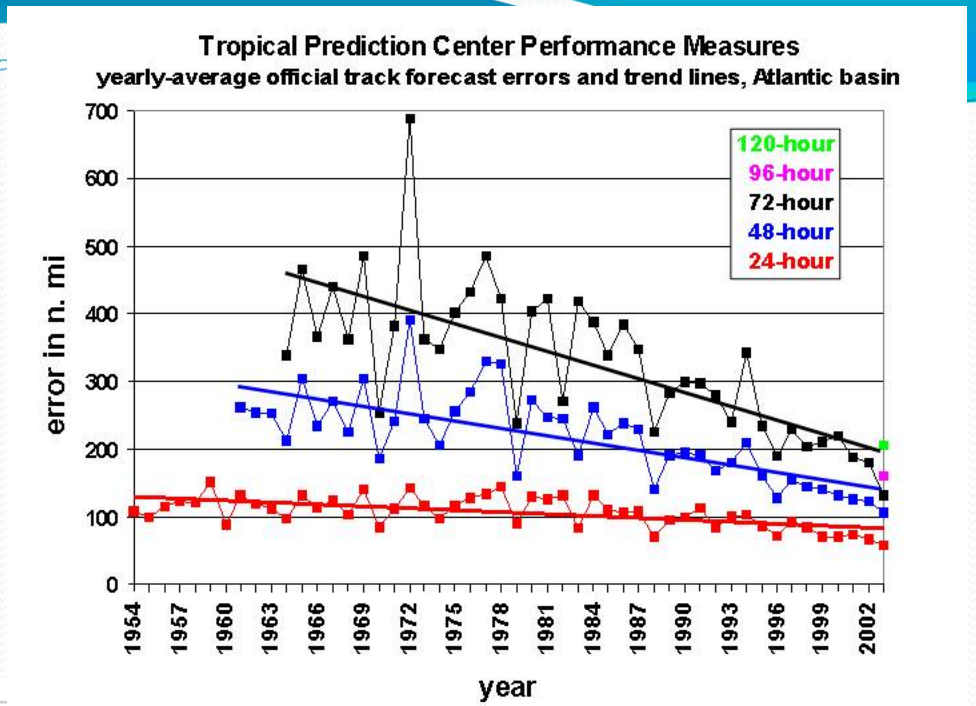
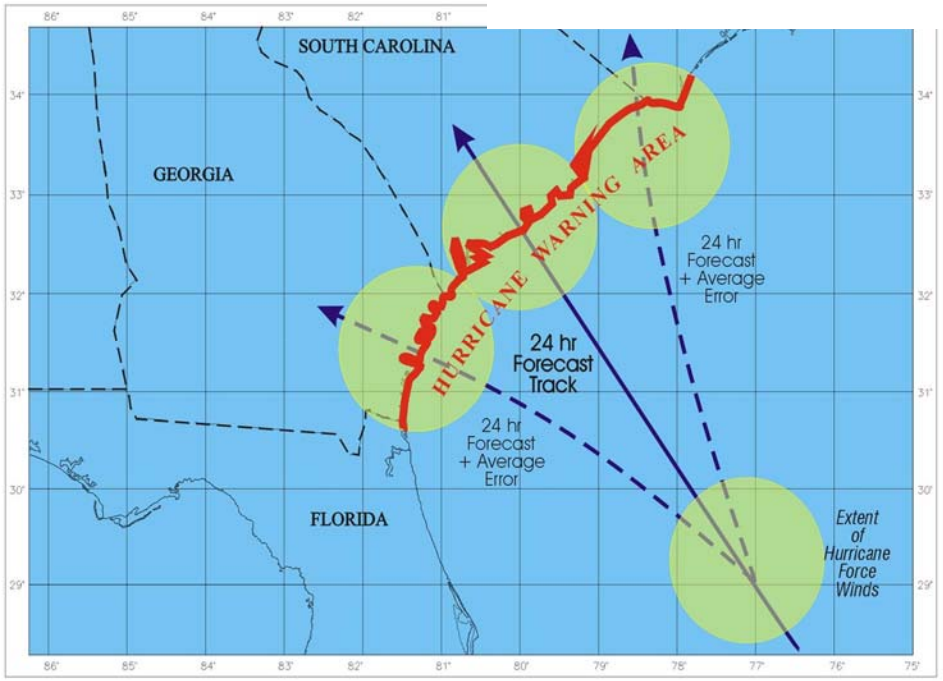
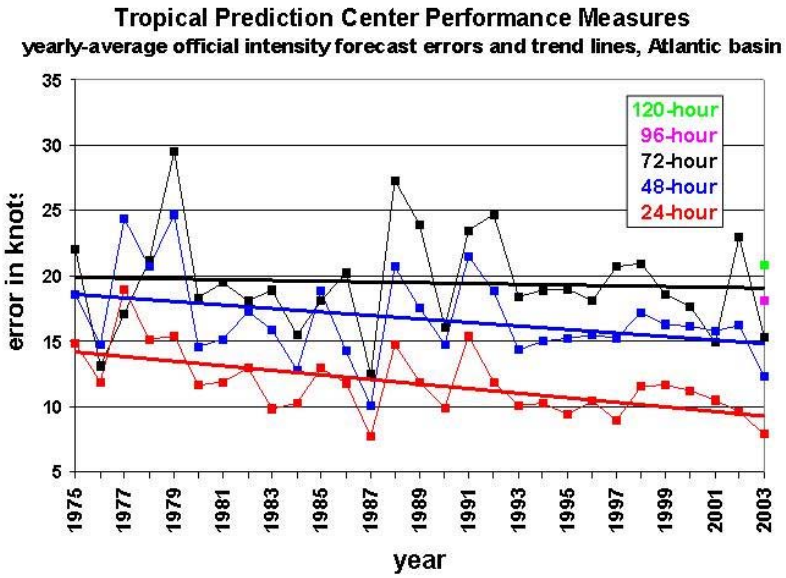
Google
Category 5
Approximate Landfall Location
McClellanville, SC (North)
Charleston, SC (Direct)
Edisto Beach, SC (South)
High Tide
Low Tide
Category 1
Category 2
Category 3
Category 4
Category 5
Show Landfall Locations
Elevation: 3
Water Level: 5
Cal Water Level: 88.2
Display Water Level: 11.8
Percent: 3
Pic Height: 4.4
Lat: 32.7737
Long: -79.8161
Water Height Adjustment: 5


Tropical Prediction Center Performance Measures
yearly-average official track forecast errors and trend lines, Atlantic basin
error in n. mi
year
120-hour
96-hour
72-hour
48-hour
24-hour
0
100
200
300
400
500
600
700
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
1999
2002


SOUTH CAROLINA
GEORGIA
FLORIDA
HURRICANE WARNING AREA
24 hr Forecast + Average Error
24 hr Forecast Track
24 hr Forecast + Average Error
Extent of Hurricane Force Winds


Tropical Prediction Center Performance Measures
yearly-average official intensity forecast errors and trend lines, Atlantic basin
error in knots
year
120-hour
96-hour
72-hour
48-hour
24-hour
5
10
15
20
25
30
35
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003

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
- PUBLISH

Summary

- PUBLIC HAS POOR UNDERSTANDING OF THE RISK ASSOCIATED WITH HURRICANE SURGE
- STANDARD FLOODZONE MAPS ARE NOT EFFECTIVE FOR MOST PEOPLE
- HOW EFFECTIVE WILL AN INTERACTIVE WEB SITE USING LOCAL LANDMARKS BE AT CONVEYING RISK OF HURRICANE SURGE?
- USE AS AN EDUCATIONAL TOOL
- DETER DEVELOPMENT OF LOW-LYING AREAS?
- THANKS TO THE NOAA (UCAR) COMET PROGRAM!

Valued Contributors

Nancy Barton
Stephen Brueske
Rhonda Crawley
Ashley A Fields
Alexandra T Gatlin
Kelly Harper
Jerry Harrison
George 'Pat' Kablick
Timmy Hartt Kent
Cang Le
Jennifer L. Mantini
Brad Milnes
Kristi Owens
Joni Rennhack
David Sattler
Jay Sonner
Kristen R Steele
Blake Williams
Robert Bright
Anne Chalmers
Jessica Darone
Katherine A Frederick
Lesley Germanow
Brandon Harris
Tobias John Hawthorne
Dr. Charles Kaiser
Amber Kuss
Dr. Norm Levine
Andrew Miller
Chinedu Nwadiugwu
Frederick “Elliot” Quinn
Eliza Morgan Reock
Sterling Savage
Zachary A Spring
Jennifer L. Thomas
Shayna Brisacher
Charles Cockcroft
Claire Dupont
Kristen Leigh Frye
Evgeni Gurovich
Raymond Harris
Daniel Johnson
Dr. Robert Kennedy
Andrew Lassister
Andrew Livingston
Dr. Laney Mills
Norton Brice Orange
Sammy S Perkins
Thomas G Rolfson
Cameron Self
Dan St. Jean
Dr. Fred Watts