

Severe Weather-Related Risk and Emergency Communication in Coastal Communities



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**HURRICANE FLOYD SYMPOSIUM
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Our Project



- Our two-year study attempts to learn how people in Eastern North Carolina are informed and use information regarding hurricanes and tropical storms.
 - Residents
 - Local government officials
 - Businesses and other organizations
- Our study is supported by North Carolina Sea Grant

Our Project



Participants

- 1079 randomly selected residents in 20 coastal and coastal-area counties
- 120 snowball sample residents (20 in each of 6 coastal and coastal-area counties).
- 24 local government officials (4 in each of the 6 counties, deliberate sample, face-to-face interview).

Survey of ENC residents



Year 1 Survey of Residents

Beaufort

Bertie

Brunswick

Camden

Carteret

Chowan

Craven

Currituck

Dare

Gates

Hertford

Hyde

New Hanover

Onslow

Pamlico

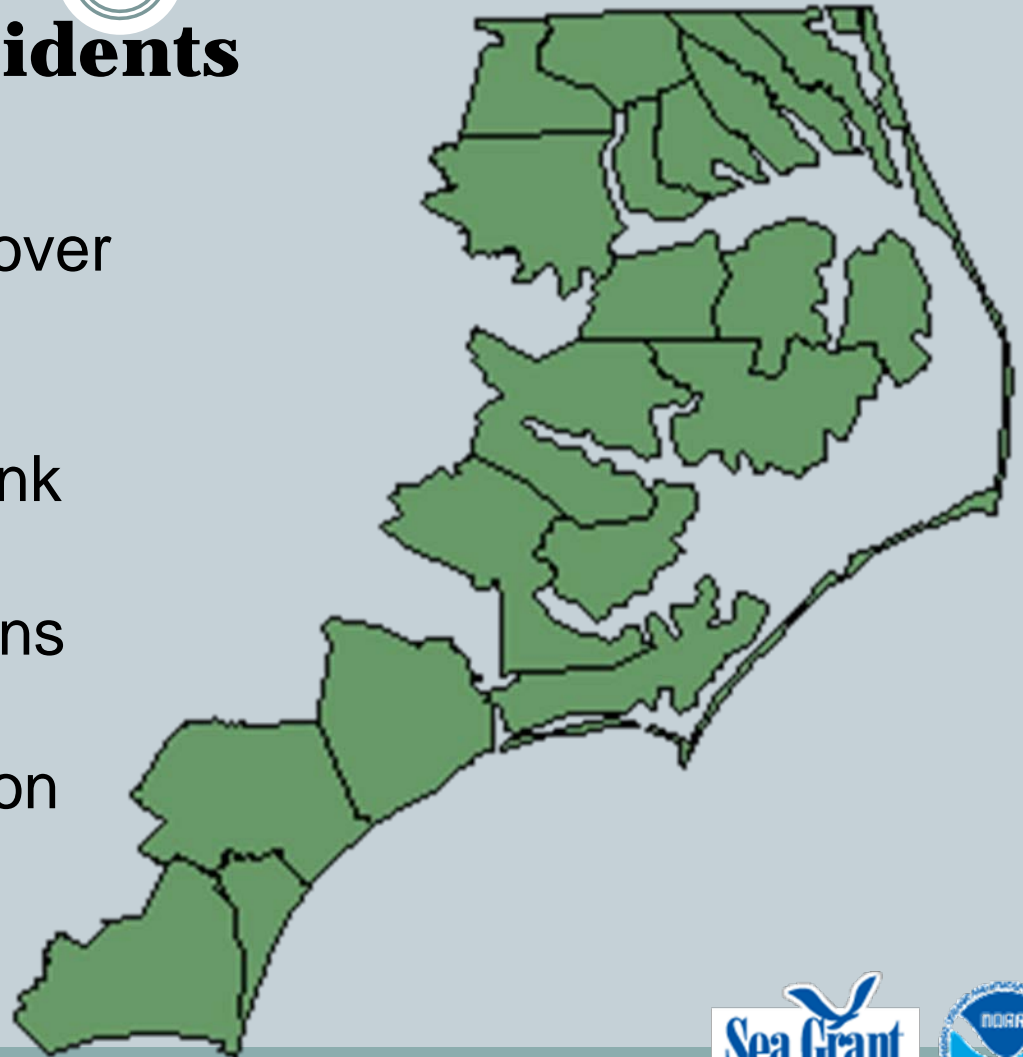
Pasquotank

Pender

Perquimans

Tyrell

Washington



Coastal and Other CAMA Counties



- Residents of Coastal Counties are more likely to have evacuated than residents of other CAMA counties (18.5% vs. 38.0%, $p = .000$)
- Some (13.6%) in both groups report a time when they wanted to evacuate but did not.
- Most common reasons for not leaving
 - Didn't know how bad it would be (25.1% vs. 13.7%, $p=.000$)
 - Needed to protect my property (7.6%)

Evacuation Decisions



- No significant difference between coastal and CAMA residents in response to a threatening hurricane:
 - 59.8% get information to decide if they should evacuate or ride out the storm
 - 33.4% get prepared to ride out the storm
 - 6.8% Get prepared to evacuate

All Tables Referring to Hurricanes Bonnie,
Dennis or Floyd are taken from:

***A Socioeconomic Impact
Analysis for Hurricanes Bonnie,
Dennis and Floyd***

by John C. Whitehead, Marieke Van Willigen, Bob
Edwards, Kenneth Wilson and John Maiolo

the Final Report to North Carolina Division of
Emergency Management (HMGP 1240-0012) and
North Carolina Sea Grant (NCSU 1998-0617-08), June
2001.



Experience with Evacuations*

Top percentages are percentages of the total respondents. Percentages in the parentheses are percentages of those people who evacuated for the hurricane named in the row who also evacuated for the hurricane identified in the column.

	Hurricane Bonnie	Hurricane Dennis	Tropical Storm Dennis	Hurricane Floyd	Percent Evacuated	Not Evacuated
Hurricane Bonnie	-----	8.8% (38.4%)	5.5% (24%)	17.2% (76%)	25.9% (100%)	74.1%
Hurricane Dennis	8.7% (67.6%)	-----	7.2% (54.8%)	11.4% (86.3%)	13.1% (100%)	86.9%
Tropical Storm Dennis	5.5% (68.1%)	7.2% (88.9%)	-----	7.5% (93.3%)	8.1% (100%)	91.9%
Hurricane Floyd	17.2% (49.7%)	11.4% (32.5%)	7.6% (21.6%)	-----	34.7% (100%)	65.3%
All Four Storms					5.0%	95%
All 1999 Storms					6.6%	93.4%
None						56.9%
Have Never Evacuated						46.3%

Important Reason for Not Evacuating

Stated Reason	Hurricane Bonnie		Hurricane Dennis		Hurricane Floyd	
	Number	Percent	Number	Percent	Number	Percent
Threat not serious enough	514	68.3%	343	72.1%	221	60.5%
Protect my property	79	10.5%	20	4.2%	25	6.8%
Concern for pets	32	4.2%	20	4.2%	18	4.9%
Job required me to stay	18	2.4%	11	2.3%	12	3.3%
I did not want to miss work	12	1.6%	7	1.5%	6	1.6%
Nowhere to go	9	1.2%	7	1.5%	6	1.6%
Not sure where to go	7	.9%	5	1.1%	5	1.4%
Physically unable to evacuate	6	.8%	2	.4%	5	1.4%
Roads were closed	4	.5%	0	0	4	1.1%
Not enough time	2	.3%	6	1.3%	8	2.2%
No means of transportation	2	.3%	0	0	2	.5%
I had car trouble	1	.1%	0	0	0	0
Other reason	67	8.9%	42	8.8%	43	11.8%
Total	753	100%	476	100%	365	100%



Evacuation Decisions



- Coastal residents are more likely than others to
 - have a disaster preparedness plan (59.7% vs. 78.0%, $p = .000$)
 - know the evacuation route they will take (86.6% vs. 92.5%, $p = .002$).
- Most people know
 - location of a nearby emergency shelter (76.2%)
 - where to send someone to get more information about shelters or evacuation routes (78.3%).

Household Storm Preparation Activities



Activity	After Hurricane Bonnie		After Hurricane Floyd		CURRENT
	% Yes	% No	% Yes	% No	
Do you prepare your property in advance of a storm?	91.0%	9.0%	89.8%	10.2%	
Do you store up to two weeks of supplies in your home?	69.7%	30.3%	61.1%	38.9%	
Does your family have a Hurricane Evacuation Plan?	48.5%	51.5%	55.9%	44.1%	78%
Do you rehearse your Hurricane Evacuation Plan	18.0%	82.0%	10%	90%	



Evacuation Orders



- Coastal residents are more likely to know if their homes are covered by evacuation orders ($p=.009$).
- About half of the respondents know that evacuation orders cover their home (49.6% vs 53.6%) and others (6.5% vs. 8.2%) know that they do not cover their home.
- More than one in four respondents do not have any idea if evacuation orders cover their homes (31.1% vs. 23.3%).

Evacuation Orders



- When an evacuation order is issued, are you more likely to evacuate?
 - 39.0% are “much more likely”
 - 22.1% are “more likely” while
 - 25.7% (over one in four) report that it has “no effect” on their decision.
- Coastal residents are **less likely** to think that evacuation orders are issued about the right time (81.0% vs. 77.0%, $p = .009$).

When a hurricane threatens this county, where do you get information?

- **Television**
- **Social Network**
- **Radio Stations**
- **An Alert Service**
- **The Internet**
- **NOAA Weather Radio**
- **Local Officials**
- **Newspapers**
- **State or National Officials**

Information Sources differ in coastal counties and other CAMA counties



- Residents of coastal counties are more likely to get information from:
 - Television
 - Social Network
 - The Internet
- Residents of other CAMA Counties are more likely to get information from:
 - Newspapers
 - State or National Officials

Quality of Information Sources



- **Television (Highest)**
- **Internet Websites**
- **NOAA Weather Radio**
- **An Alert Service**
- **Commercial or Public Radio**
- **Local Officials**
- **Social Networks**
- **State or National Officials**
- **Newspapers (lowest)**

Quality of Information Sources



- Only one information source is rated differently by coastal and other CAMA residents.
 - Coastal residents rate the quality of information that they receive from their social networks **lower** than residents of other CAMA counties.

Conclusions



- Coastal county residents are more likely to have evacuated than residents in other counties.
- Roughly 1 resident in 8 reports that they failed to evacuate when they should have. The primary reason they stayed is because they misjudged the severity of the storm.
- Roughly 6 in 10 residents actively seek information to help them decide whether or not to evacuate whenever a hurricane is threatening,

Conclusions



- Roughly 1 in 4 coastal residents and 1 in 3 residents of other counties do not know if an evacuation order covers their home.
- Evacuation orders make it more likely that most residents will evacuate but do not affect 1 in 4.
- People get more information from TV, their social networks and radio and report that they get the highest quality information from TV, the Internet and NOAA Weather Radio.

Issues for Further Analysis



- Add granularity to information about media consulted
- Conduct factor analysis and multiple regression to determine whether/ which demographic factors account for media choices and combinations of media choices
- Identify opportunities for using technologies already in residents' hands (e.g., cell phones)
- Evaluate problem interpretations of information (i.e. “cone of uncertainty;” watch and warning language)

For More Information



- If you have questions about applying this information to your local area, please contact Donna Kain (Kaind@ecu.edu)
- If you have questions about the statistics used in this presentation, please contact Professor Wilson (wilsonk@ecu.edu)