Coastal Community Hazard Mitigation and Community Rating System of National Flood Insurance Program

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National Flood Insurance Program (NFIP)

- Challenges of flood hazard
  - Contain the cost of damage
  - Provide relief to victims
- National Flood Insurance Program (1968)
  - Risk identification
  - Hazard mitigation
  - Insurance provision

Community Rating System (CRS)

- Created by Federal Insurance Administration in 1990
- Instituted by Insurance Service Office, Inc. (ISO)
- Recognizes 18 creditable activities under 4 categories:
  - Public information
  - Mapping and regulations
  - Flood damage reduction
  - Flood preparedness

Category	*Activity*	*Points*
Public Information	1. Elevation Certificates	162
	2. Map Information	140
	3. Outreach Projects	380
	4. Hazard Disclosure	81
	5. Flood Protection Information	102
	6. Flood Protection Assistance	71

CRS Class, Score, and Flood Insurance Premium Discount

CRS Class	*Total Score*	*Premium Discount*
1	4,500+	45%
2	4,000-4,499	40%
3	3,500 – 3,999	35%
4	3,000 – 3,499	30%
5	2,500 – 2,999	25%
6	2,000 – 2,499	20%
7	1,500 – 1,999	15%
8	1,000 – 1,499	10%
9	500 – 999	5%
10	0 – 499	---

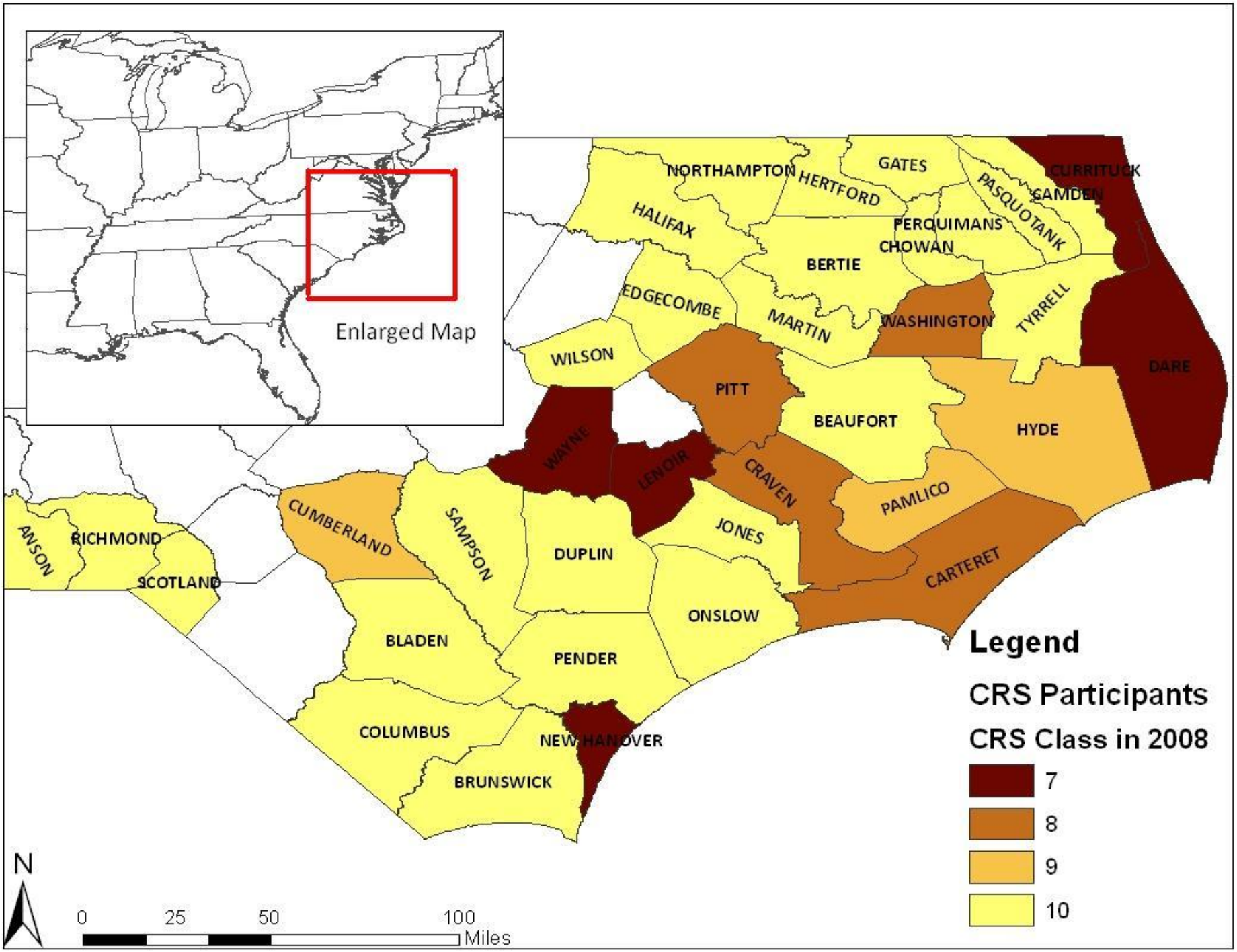
Problems

- Only 1080 communities (5% of all NFIP communities) have enrolled in CRS (2008)

- In North Carolina, 75 out of 530 NFIP communities (14.1%) have enrolled in CRS (2008)

Objectives

- Provide empirical evidence related to community decisions involving flood risk mitigation projects.
- Test a number of hypotheses to explain why relatively few local governments adopt hazard mitigation.
- Explore whether physical, risk, and socioeconomics characteristic vary among CRS and Non-CRS communities.


Enlarged Map
NORTHAMPTON
HERTFORD
GATES
CURRITUCK
CAMDEN
PASQUOTANK
HALIFAX
PERQUIMANS
CHOWAN
BERTIE
EDGECOMBE
MARTIN
WASHINGTON
TYRRELL
DARE
WILSON
PITT
BEAUFORT
HYDE
WAYNE
LENOIR
CRAVEN
PAMLICO
JONES
CUMBERLAND
SAMPSON
DUPLIN
CARTERET
ANSON
RICHMOND
SCOTLAND
ONSLOW
BLADEN
PENDER
COLUMBUS
NEW HANOVER
BRUNSWICK
Legend
CRS Participants
CRS Class in 2008
7
8
9
10
N
0
25
50
100
Miles

Data: 2002 - 2008

- 37 Coastal Counties: 12 enrolled in CRS
- Dependent variable: CRS scores and class

(collected from ISO annual reports)

- The explanatory variables are organized under

3 broad categories:

  - Environmental and Risk Variables
  - Economic Variables
  - Social Variables

Environmental and Risk Variables	Mean (Std)	Min	Max
Flood Events in previous year	0.795 (1.258)	0	9
Property Damage in previous year flooding (thousands)	$18.758 ($185.026)	0	2107.142
Fatality and Injury in previous year flooding	0.004 (0.062)	0	1
Hurricane Events in previous year	0.367 (0.585)	0	2
The number of flood events from 1991-2001	3.459 (1.309)	1	6
The percentage of parcel land in SFHA (2008)	0.289 (0.195)	0.082	0.873
Number of Flood Control Dams	0.514 (1.674)	0	9

Economic Variables	Mean (Std)	Min	Max
Average Premium per policy	$422.98 ($130.95)	151	1510
Total NFIP Policies	1,191 (1,034)	1	10613
Total Premium Reduction (thousands)	24.998 (83.401)	0	612.242
Property Tax Revenues (millions)	24.505 (27.057)	1.964	141.940
Median Household Income (thousands)	44.391 (6.184)	28.200	65.100

Social Variable	Mean (Std)	Min	Max
Population	55,942 (60,023)	4,087	312,696
Population of 65 year or over	7,069 (5,916)	626	29,285
Total Housing Units (thousands)	26.841 (27.005)	2.074	136.947
High school degree or higher	0.791 (0.067)	0.663	0.932
Bachelor degree or higher	0.166 (0.067)	0.07	0.35

Definition	CRS County		Non_CRS County		Test statistic
	N	Mean (std)	N	Mean (std)	*T-Test*
Hurricane in previous year	83	0.494 (0.612)	176	0.307 (0.563)	0.0159*
Total NFIP Policies	83	2558 (2931)	175	542 (862)	<.0001*
Property Tax Revenues (millions)	83	40.084 (38.417)	176	17.158 (14.778)	<.0001*
Median Household Income	83	48,838.55 (6054.51)	176	42,294.03 (5040.10)	<.0001*

Definition	CRS County		Non_CRS County		Test statistic
	N	Mean (std)	N	Mean (std)	*T-Test*
Population	83	86,850 (86,745.44)	176	41,366.95 (33,450.52)	<.0001*
65 year or over	83	10,273 (8192.59)	176	5,558 (3604.91)	<.0001*
Total Housing Units	83	42,655 (37,032.23)	176	19,382 (16,060.15)	<.0001*

Definition	CRS County		Non_CRS County		Fisher's Exact Test
	N	Mean (std)	N	Mean (std)	
Percentage of parcel land in SFHA	83	0.39 (0.253)	155	0.235 (0.125)	<.0001*
High school degree or higher	62	0.849 (0.052)	127	0.763 (0.054)	<.0001*
Bachelor degree or higher	62	0.229 (0.073)	127	0.136 (0.036)	<.0001*

Preliminary Conclusions

- CRS points for NC coastal counties have increased from 2002 to 2008.
- Hurricane experience encourages local hazard mitigation.
- CRS counties exhibit greater flood risk.
- CRS counties exhibit greater population and number of house units.
- CRS counties are more wealthy and educated.

Future Research

- Multiple regression analysis of CRS *mitigation points* (cross-sectional, time series → "panel" data)
- Ordered Probit Model analysis of CRS Class
  - CRS class is ordinal and can take 10 discrete values, which makes Ordinary Least Squares inappropriate.
- Expand research to the multi-jurisdictional scale
  - NFIP (CRS divisions) include towns, city, and county.

Thank you very much.

Questions and Comments?

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