

Community Vulnerability Assessment Tutorial (CVAT)

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Community Vulnerability Assessment Tutorial (CVAT)

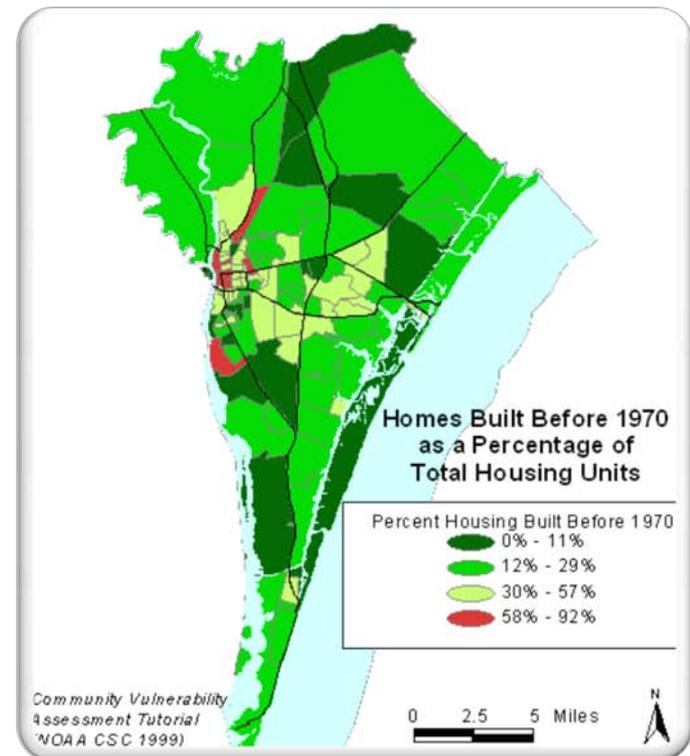


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Introduction

Overview

A **risk and vulnerability assessment (RVA)** helps to identify people, property, and resources that are at risk of injury, damage, or loss from hazardous incidents or natural hazards.



Introduction

Community Vulnerability Assessment Tutorial (CVAT)

- Community-wide general assessment method
- Primary driver for hazard mitigation and climate adaptation planning
- Process to help in vulnerability screening
- Seven-step process
- Tool to raise awareness about risk and vulnerability and demonstrate a multi-sector approach to hazard mitigation planning



Introduction

Community Vulnerability Assessment



1. Hazard Identification



2. Hazard Analysis
Mapping



3. Critical Facilities
Vulnerability Analysis



4. Societal Vulnerability
Analysis



5. Economic Vulnerability
Analysis



6. Environmental Vulnerability
Analysis



7. Mitigation Opportunities
Analysis



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Hazard Identification

Step 1: Hazard Identification

What hazards are you concerned about?
How would you prioritize them?



Storm Surge
Wind
Flood
Tornado
Earthquake
Wildfire
Hazardous Spills
Toxic Release

Input



Hazard
Identification

Analysis



List of prioritized
hazards for use in
developing
mitigation strategies
and prioritizing
mitigation projects

Output



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Hazard Identification

Step 1: Hazard Identification

Step 1a: Identify hazards

Step 1b: Establish relative priorities
for your hazards

Calculating Relative Priority:

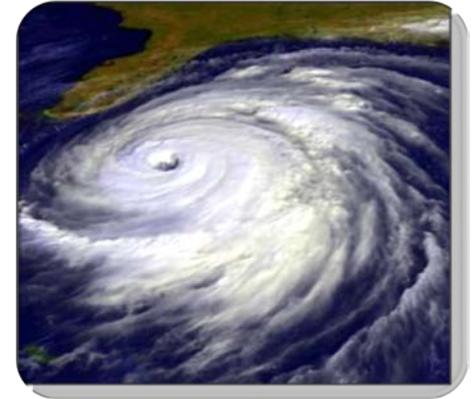
(Frequency + Area Impact) X Potential Damage Magnitude = Total Score
based on a scale of 1-5 where 1 = low risk; 5 = high risk

Hazard	Frequency +	Area Impact x	Magnitude =	Total
Storm Surge	2	4	5	30
Wind	3	5	4	32
Flood	4	4	4	32
Tornado	2	1	5	15
Coastal Erosion	3	2	3	15
Earthquake	1	4	5	25
Wildfire	3	3	3	18

Hazard Analysis

Step 2: Hazard Analysis

Where are your risk consideration areas?
How would you prioritize these risk areas?



Input

Analysis

Output

SLOSH Model
Inland Winds Model
Floodplain Maps
Soils
Land Cover
Erosion Rates
Hazardous Waste



**Hazard
Analysis**



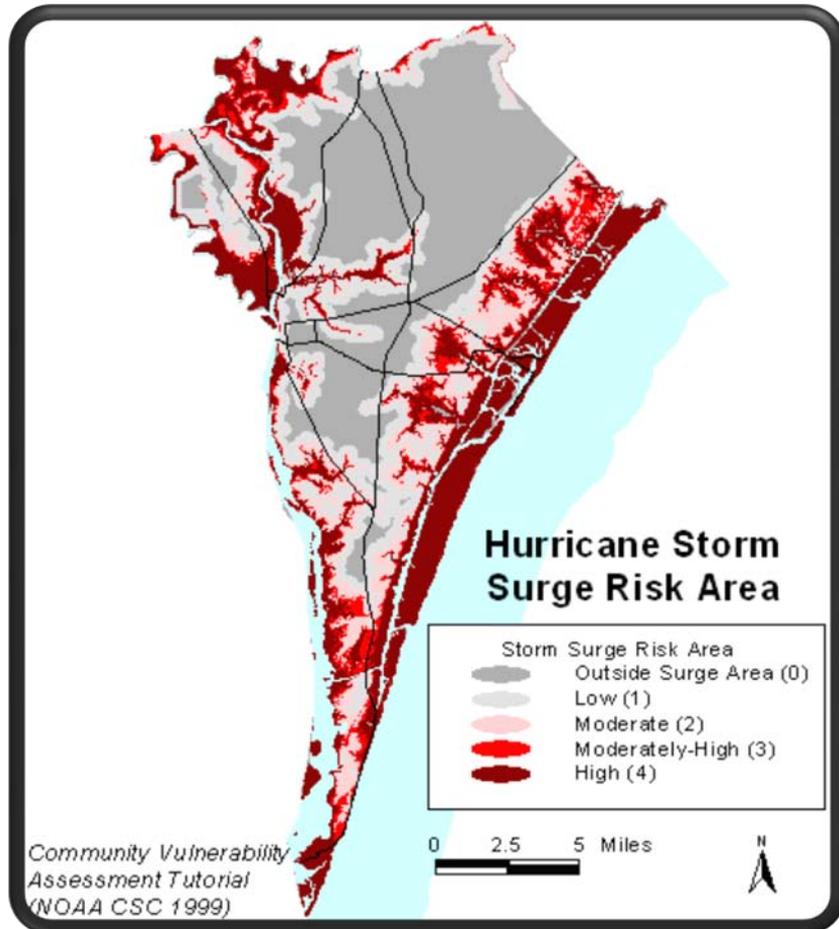
Geographically defined risk consideration areas to be used as a filter for analyzing vulnerability and targeting high-risk locations for mitigation projects



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Hazard Analysis

Step 2a: Map risk consideration areas

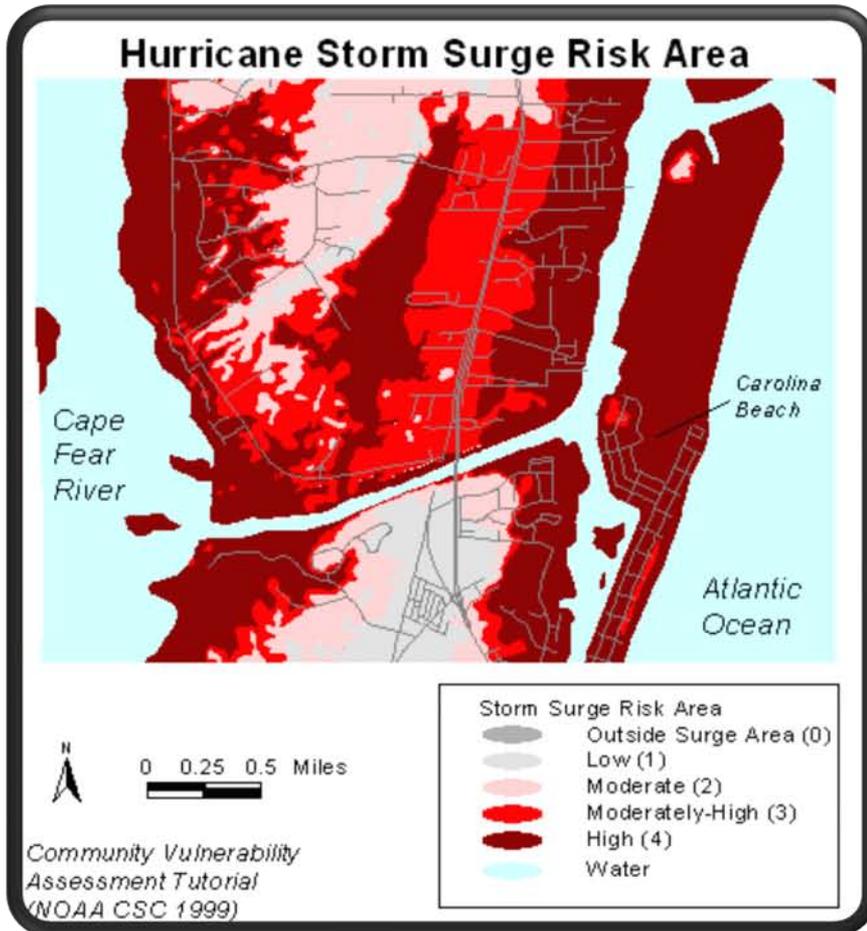


- Use hazards prioritized in Step 1
- Determine where these hazards are occurring



Hazard Analysis

Step 2b: Assign scores to the prioritized risk consideration areas



Example: surge zones have varying degrees of risk (e.g., category 1 zone vs. category 5)



Hazard Analysis

Output of Step 2

Geographically defined risk consideration areas to be used as . . .

- filter for analyzing vulnerability
- means to target high-risk locations for mitigation projects



Societal Analysis

Step 4: Societal Analysis

Where are your high-need neighborhoods?
How vulnerable are they to hazard impacts?



Input

Analysis

Output

Poverty
Age
Minority Population
No Vehicles
Female Households
Rental Households
Public Assistance
Non-English Speaking



**Societal
Analysis**



Geographically defined areas of high risk coupled with minimal personal resources for hazard recovery; can be used to develop mitigation strategies and target high-need locations

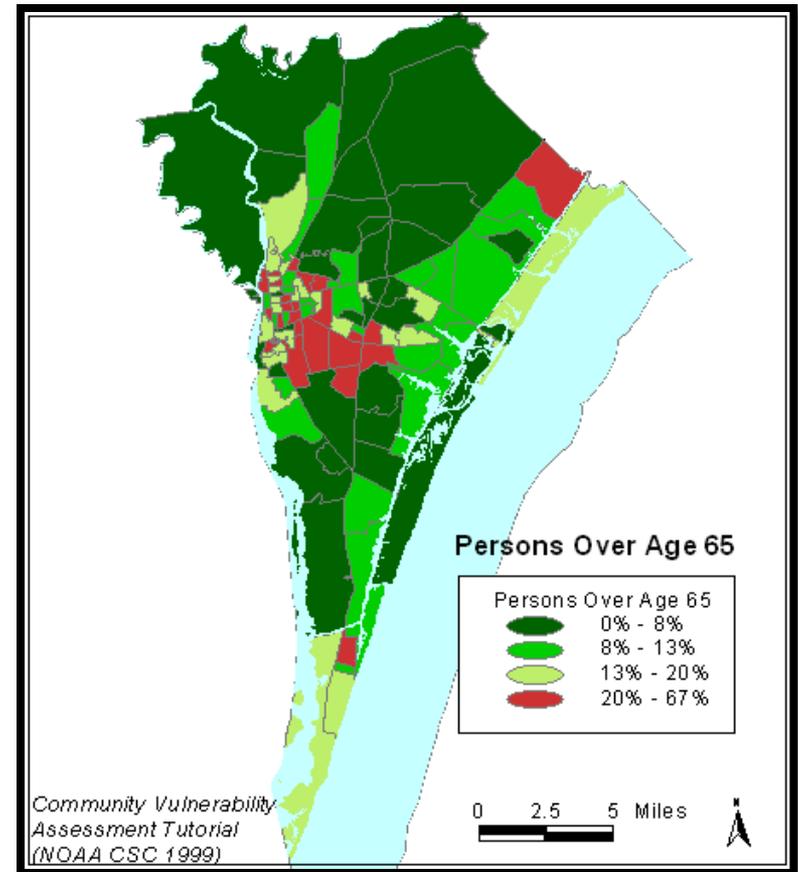


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Societal Analysis

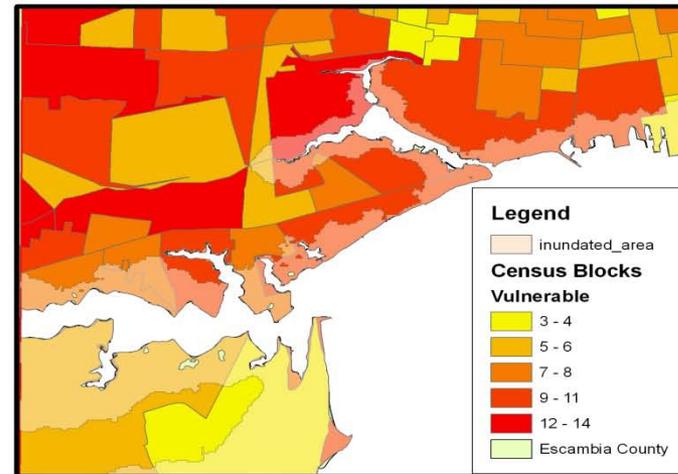
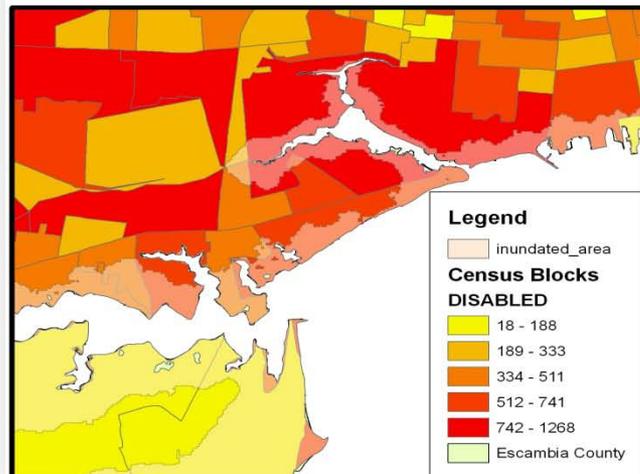
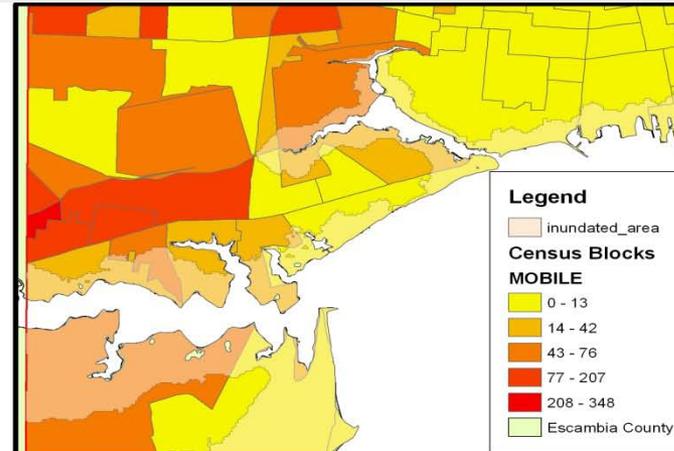
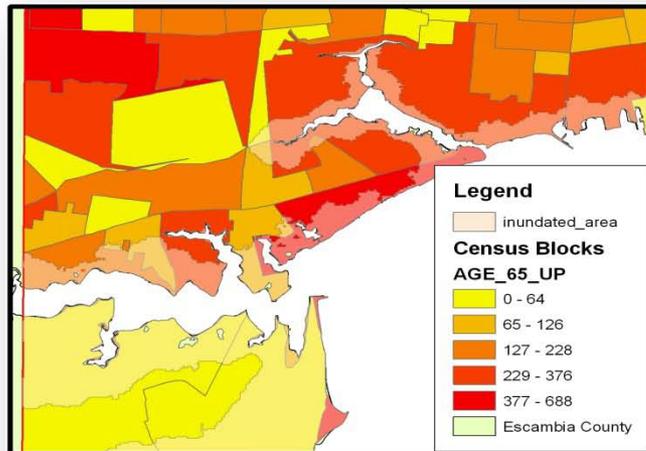
Step 4a: Identify areas of special consideration

- Population over age 65
- Renters
- Single family
- Below poverty
- Mobile home
- High school diploma
- No vehicle



Societal Analysis

Step 4b. Identify intersection of high-risk areas and special consideration areas



Societal Analysis

DISABLED	Disabled_R		MOBILE	Mobile_Ran	
18	1	CS	0	1	
18	1	65_U	0	1	Mobile_Ran
118	1		0	1	4
150	1		0	1	1
152	1		0	1	2
162	1		0	1	1
188	1		0	1	3
231	2		0	1	4
231	2		0	1	2
238	2		0	1	3
246	2		0	1	1
255	2		0	1	1
255	2		0	1	1
257	2		0	1	1
261	2		0	1	1
264	2		4	1	1
277	2		4	1	1
281	2		5	1	2
286	2		5	1	4
290	2		5	1	1
305	2		6	1	2
321	2		7	1	4
321	2		7	1	1
333	2		7	1	1
365	3		7	1	1
392	3		9	1	1
397	3		9	1	2
402	3		13	1	3
410	3		18	2	1
432	3		18	2	
442	3		20	2	

Step 4b: Rank areas of special consideration

Result: Societal risk summary score



	AGE_65_UP	Over65_Ran	DISABLED	Disabled_R	MOBILE	Mobile_Ran	Vulnerable
	30	1	18	1	0	1	3
	56	1	152	1	0	1	3
	4	1	118	1	0	1	3
	15	1	188	1	5	1	3
		1	150	1	0	1	3
		2	162	1	0	1	4
		1	261	2	0	1	4
		1	246	2	0	1	4
		1	257	2	0	1	4
		2	321	2	0	1	5
		2	286	2	0	1	5
		1	442	3	6	1	5
		2	231	2	0	1	5
		2	333	2	7	1	5
		2	321	2	0	1	5
		2	255	2	5	1	5
		1	290	2	33	2	5
		1	238	2	42	2	5
		1	18	1	49	3	5
		1	255	2	38	2	5
		2	432	3	0	1	6
		2	458	3	0	1	6
		2	365	3	0	1	6
		2	281	2	26	2	6
		2	392	3	0	1	6
		1	277	2	51	3	6
		3	305	2	9	1	6
		3	483	3	7	1	7
		3	462	3	5	1	7
		3	410	3	7	1	7
		3	459	3	0	1	7
		1	529	4	20	2	7
		2	451	3	18	2	7
		1	264	2	108	4	7
		3	741	4	4	1	8
		3	584	4	13	1	8
		4	442	3	0	1	8
		3	460	3	21	2	8
		2	231	2	127	4	8
		3	651	4	0	1	8

Field Calculator

Fields:

- PERIMETER
- ACRES
- LOGRECNO
- TOTAL_POP
- SAMPLE_POP
- POP2000
- MEDFINCOME
- DESCRIPT
- Over65_Ran
- Disabled_R
- Mobile_Ran
- Vulnerable

Type:

- Number
- String
- Date

Functions:

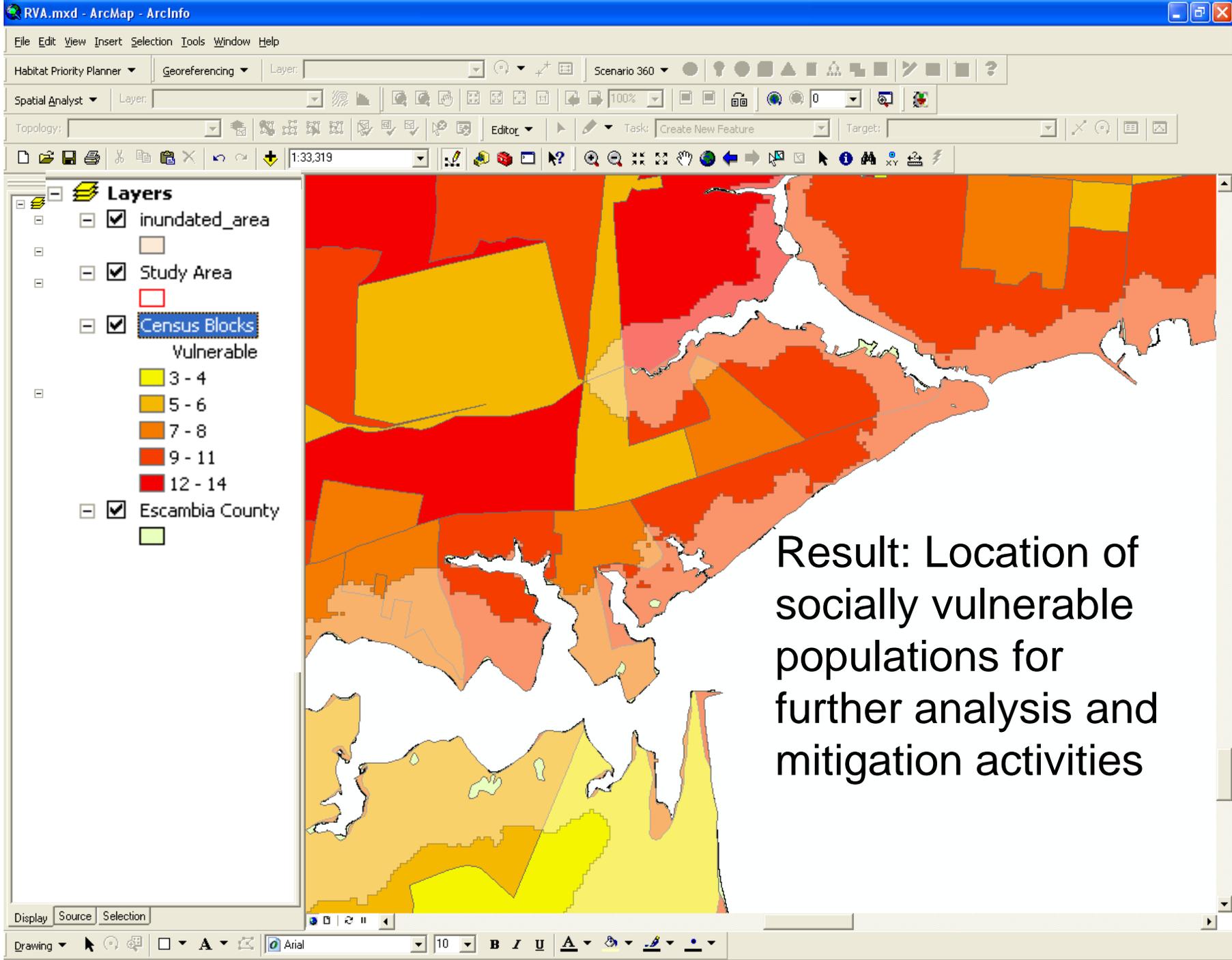
- Abs ()
- Atn ()
- Cos ()
- Exp ()
- Fix ()
- Int ()
- Log ()
- Sin ()
- Sqr ()

Vulnerable = Advanced

[Over65_Ran] + [Disabled_R] + [Mobile_Ran]

Calculate selected records only

Buttons: * / & + - = Load... Save... Help OK Cancel



Result: Location of socially vulnerable populations for further analysis and mitigation activities

Next Steps

Vulnerability Reduction

Altering or maintaining the coastal environment:

erosion control, wetlands restoration, nonstructural mechanisms

Strengthening the built environment:

wind proofing, wet/dry flood proofing, elevating structures

Vulnerability Avoidance

Managing development in high hazard areas:

land use planning, economic incentives, education, codes

Limiting development in high hazard areas:

permitting, zoning, moratoriums, development caps



Additional Information

NOAA Coastal Services Center

www.csc.noaa.gov/rvat/



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