Are Floodplain 'Buyouts' A Smart Investment for Municipalities?

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2018

Hurricane Matthew Flooding in Lumberton, NC (PBS)

Project Purpose

Mitigation is a good investment for the federal government, yielding _benefit-cost ratios of 6 to 1_ (NIBS, 2017)

But…

What is the long-term fiscal impact of flood buyouts on municipal governments?

Hurricane Matthew Flooding in Lumberton, NC (Reuters)

Municipality Fiscal Impacts of Buyouts

Costs

Benefits
(Avoided Costs of Response & Recovery)

(Direct Costs)

Property Tax Revenue

Buyout Property Maintenance

Utility (Electricity/Water/Sewer) Revenue

(Indirect Cost)

Sales Tax Revenue

(Response & Recovery)

Infrastructure Maintenance*

Administrative Costs

Evacuation (Swift water rescues)

Police and Fire (closing off streets, etc.)

Opening & Operating Shelters

Debris Removal
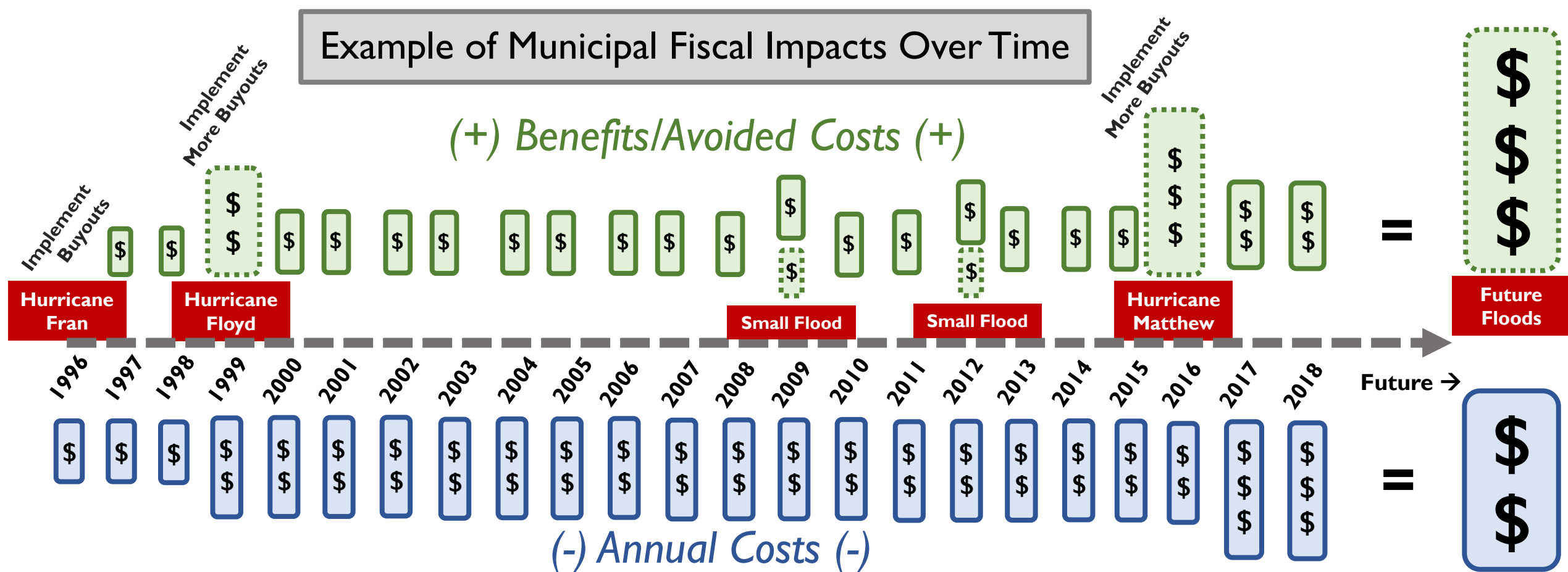
Infrastructure Repairs

Annual Effect | Effect Per Flood Event | = May be reimbursed by FEMA/State | *Benefit if 'complete'

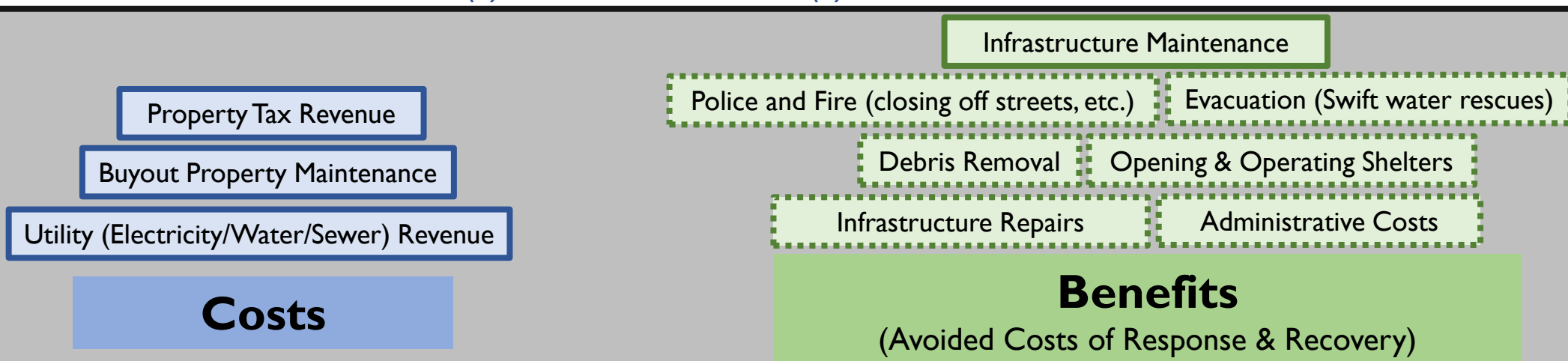Example of Municipal Fiscal Impacts Over Time

(+) Benefits/Avoided Costs (+)

Implement Buyouts
Implement More Buyouts
Implement More Buyouts

Hurricane Fran · Hurricane Floyd · Small Flood · Small Flood · Hurricane Matthew · Future Floods

1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 Future →

(-) Annual Costs (-)

Costs
- Property Tax Revenue
- Buyout Property Maintenance
- Utility (Electricity/Water/Sewer) Revenue

Benefits (Avoided Costs of Response & Recovery)
- Infrastructure Maintenance
- Police and Fire (closing off streets, etc.)
- Evacuation (Swift water rescues)
- Debris Removal
- Opening & Operating Shelters
- Infrastructure Repairs
- Administrative Costs

Community Case Studies (8)
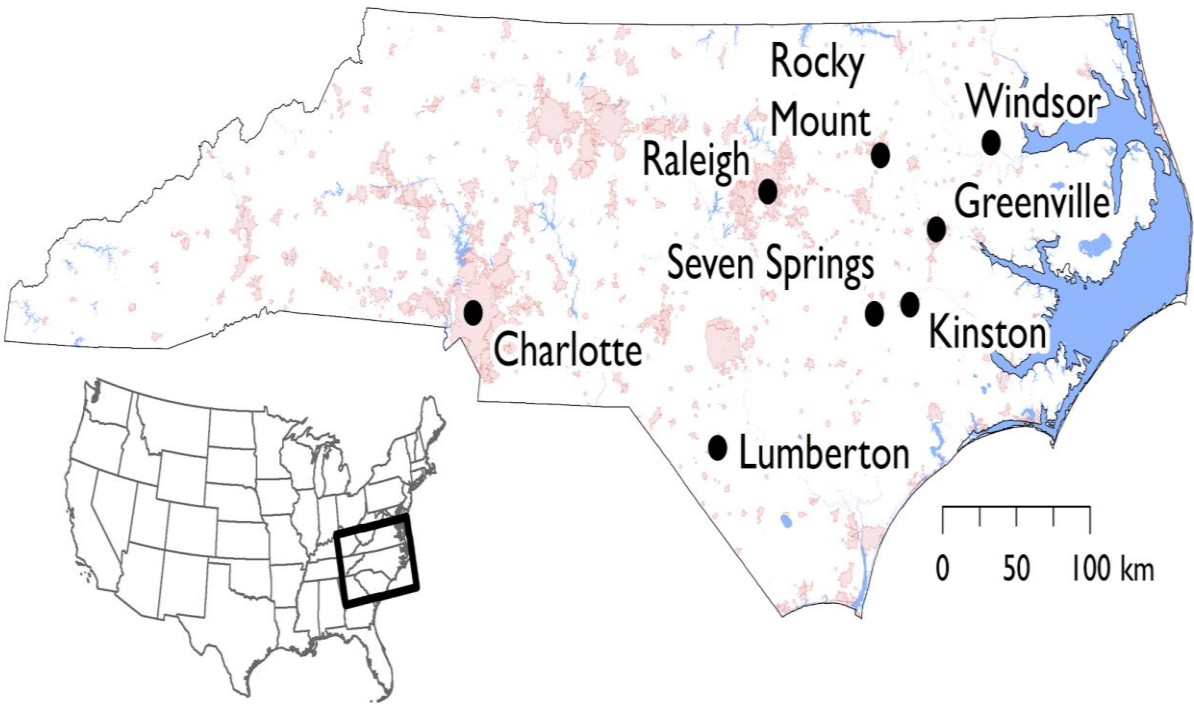
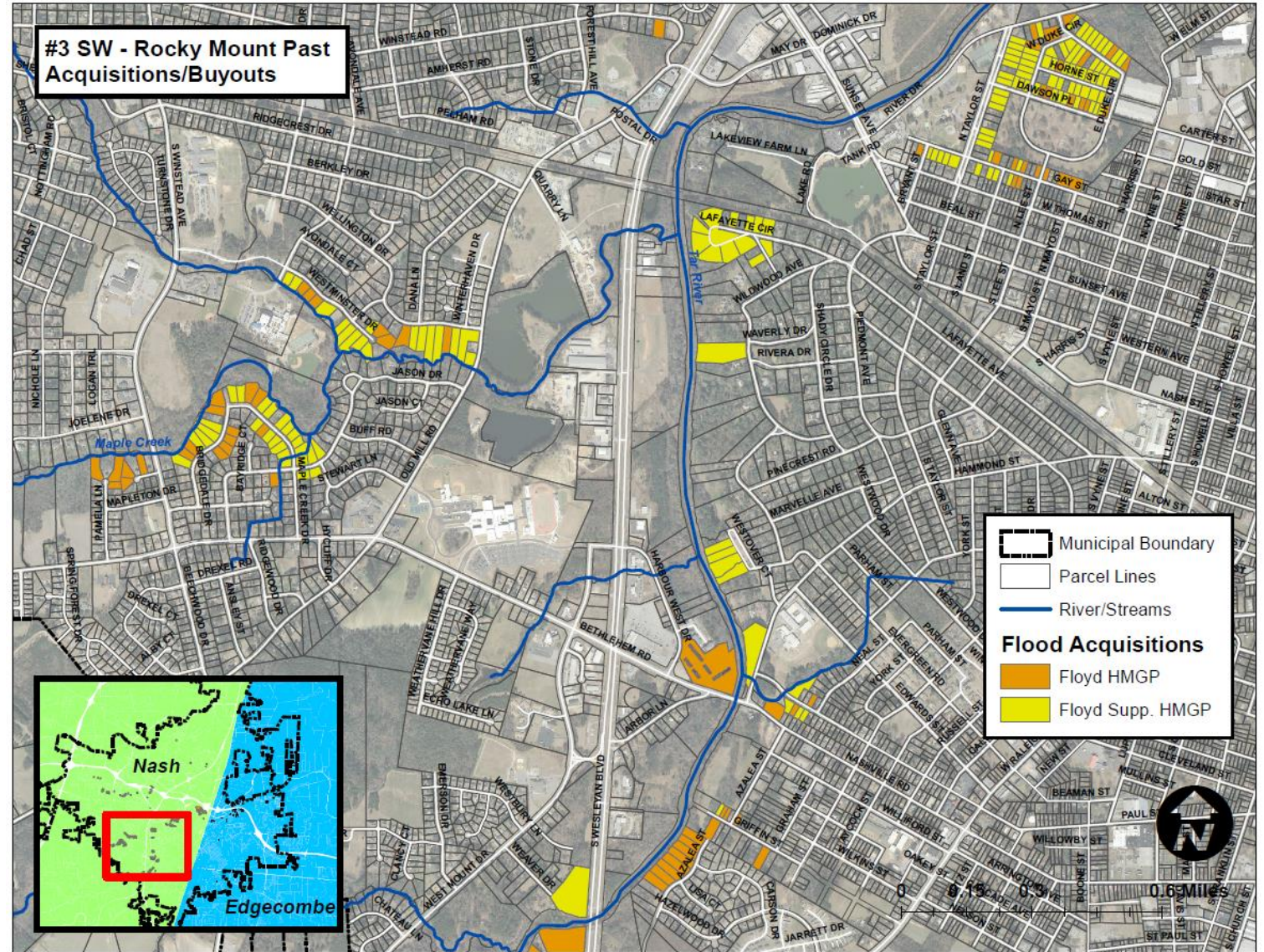| Municipality	County	Community Size	# People	# Past Buyouts	# Expected Matthew Buyouts
Charlotte	Mecklenburg	Large	842,051	166*	N/A
Raleigh	Wake	Large	458,880	37	N/A
Greenville	Pitt	Medium-Large	91,500	189*	2
Rocky Mount	Edgecombe, Nash	Medium	55,500	388*	147
Lumberton	Robeson	Small-Medium	21,500	73	47
Kinston	Lenoir	Small-Medium	21,000	685*	50
Windsor	Bertie	Small	3,769	32	32
Seven Springs	Wayne	Small	110	10	20
			Total	**1,580**	**298**

* # of buyouts analyzed, though there were more

Site Visits:
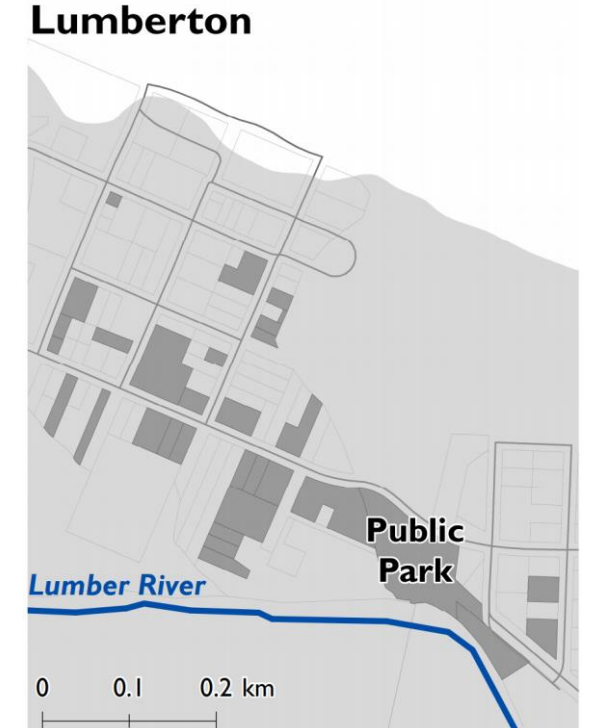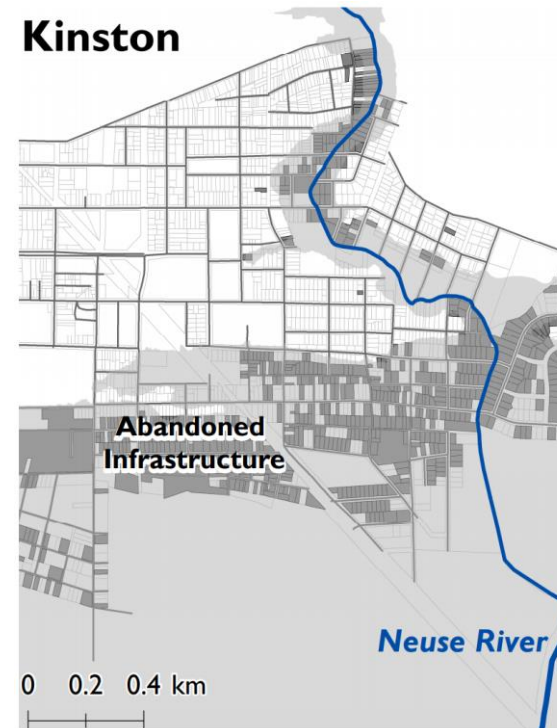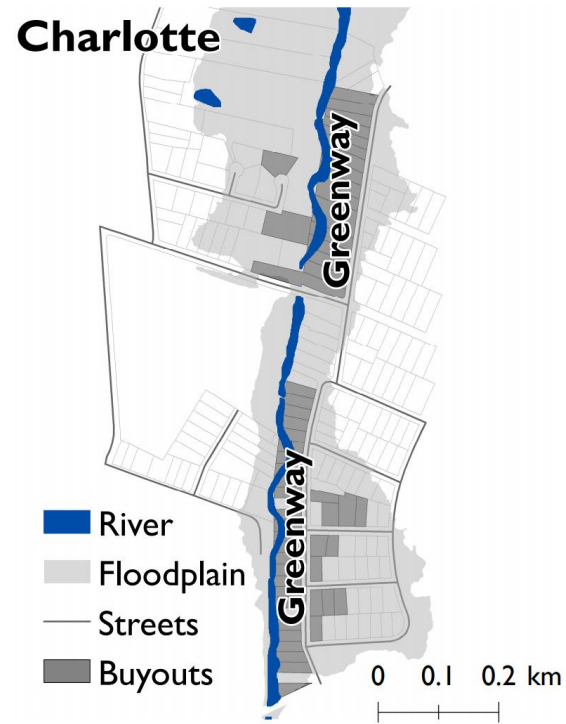Charlotte, Lumberton, Seven Springs, Rocky Mount, Greenville and Windsor

Mapping Buyout Properties Using GIS

- Merging data sets using common identifier (PIN #)
  1) NCEM Hazard Mitigation Projects
  2) County Parcel Boundaries
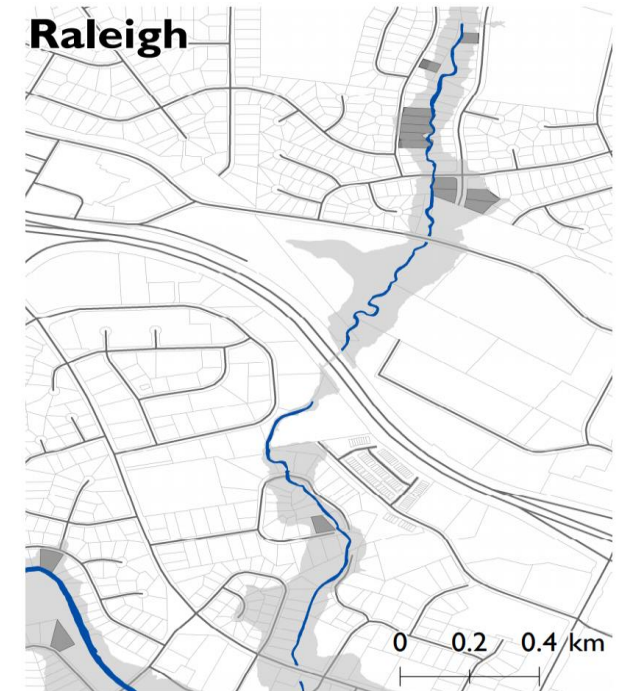
- Not always perfect 1 to 1 matching up of data

Buyout Spatial Patterns

Charlotte

Greenway
Greenway

- **River**
- **Floodplain**
- **Streets**
- **Buyouts**

0   0.1   0.2 km

Greenville

0   0.25   0.5 km

Tar River   Greenway

Kinston

Abandoned
Infrastructure

0   0.2   0.4 km
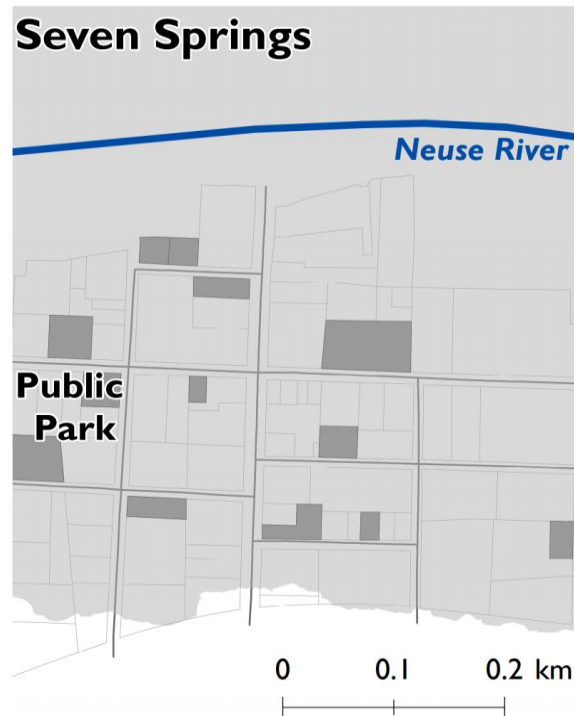
Neuse River

Lumberton

Lumber River   Public
Park

0   0.1   0.2 km
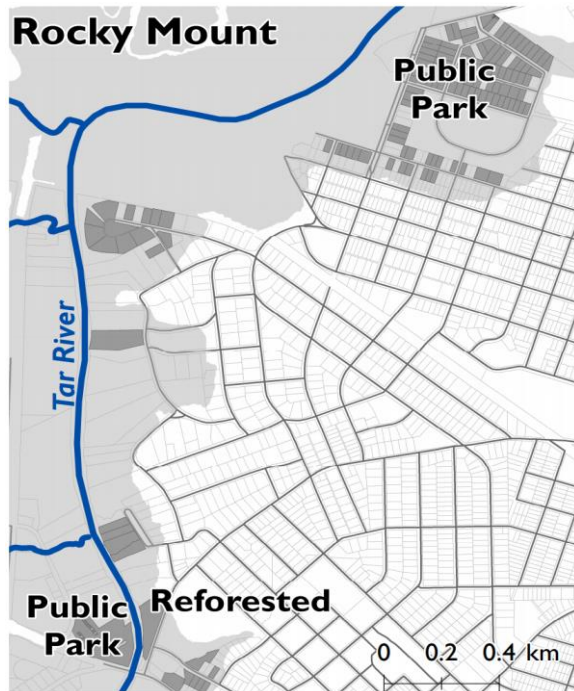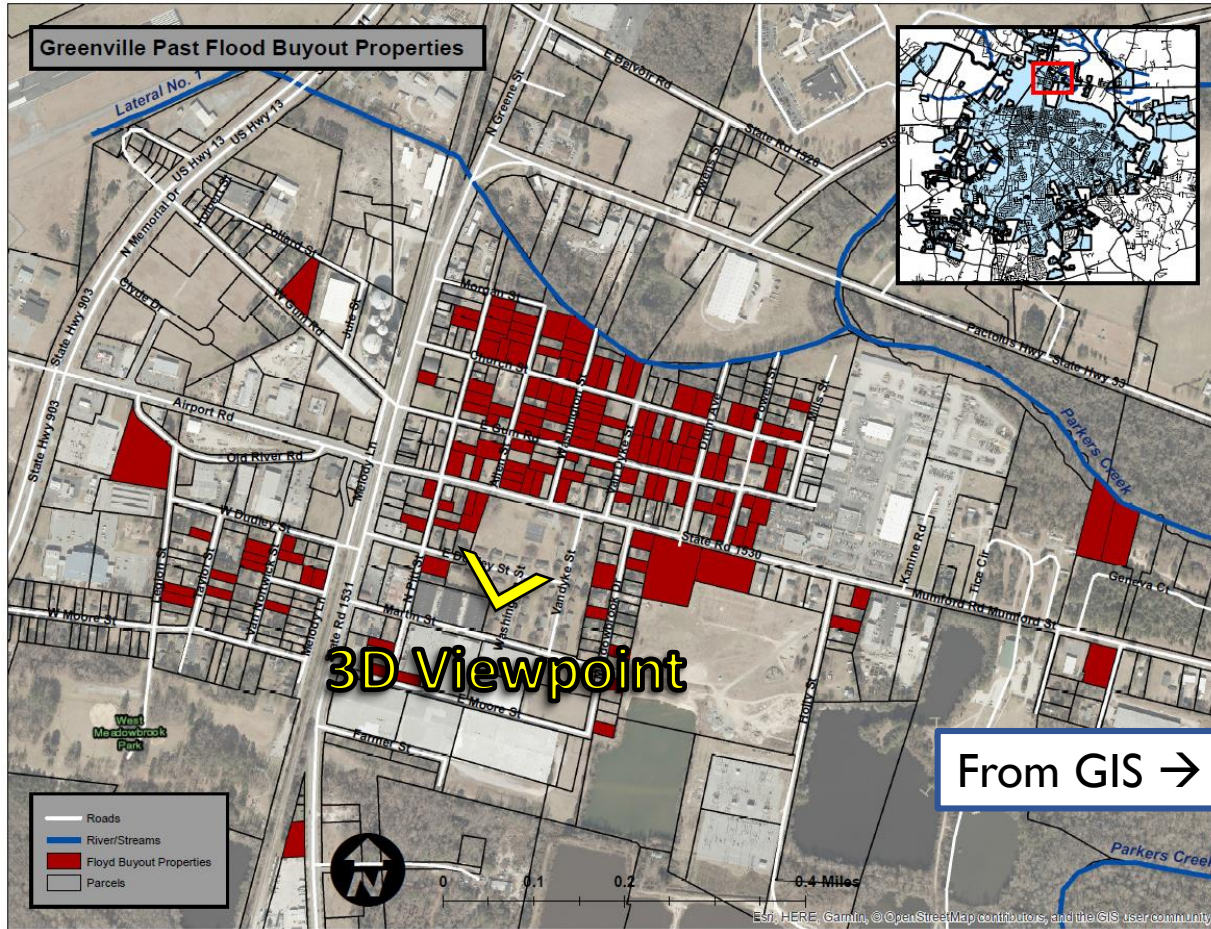
Buyout Spatial Patterns

Rocky Mount, NC

Current uses of buyout properties: Disc golf, dog park, greenway, barbecue park, forest
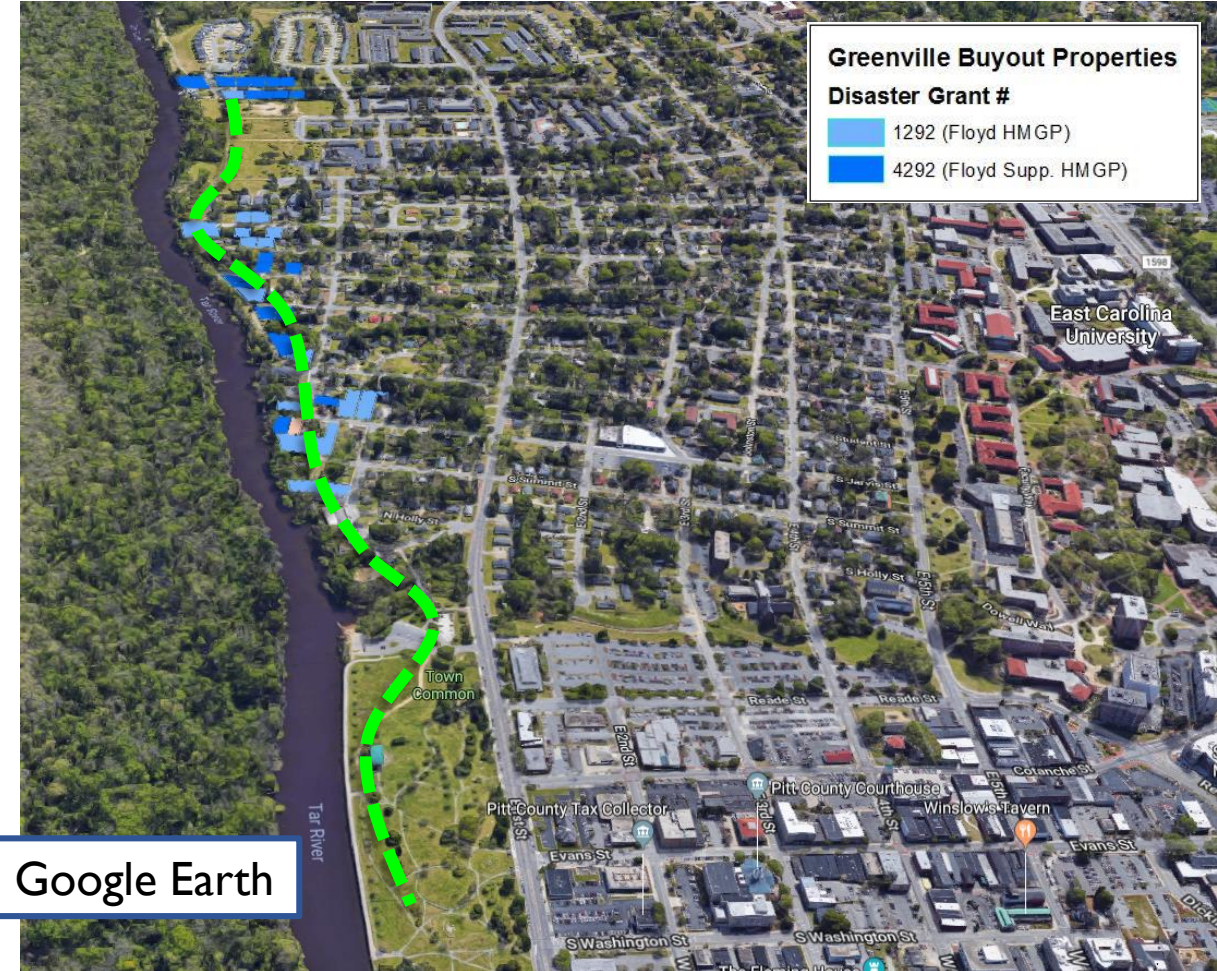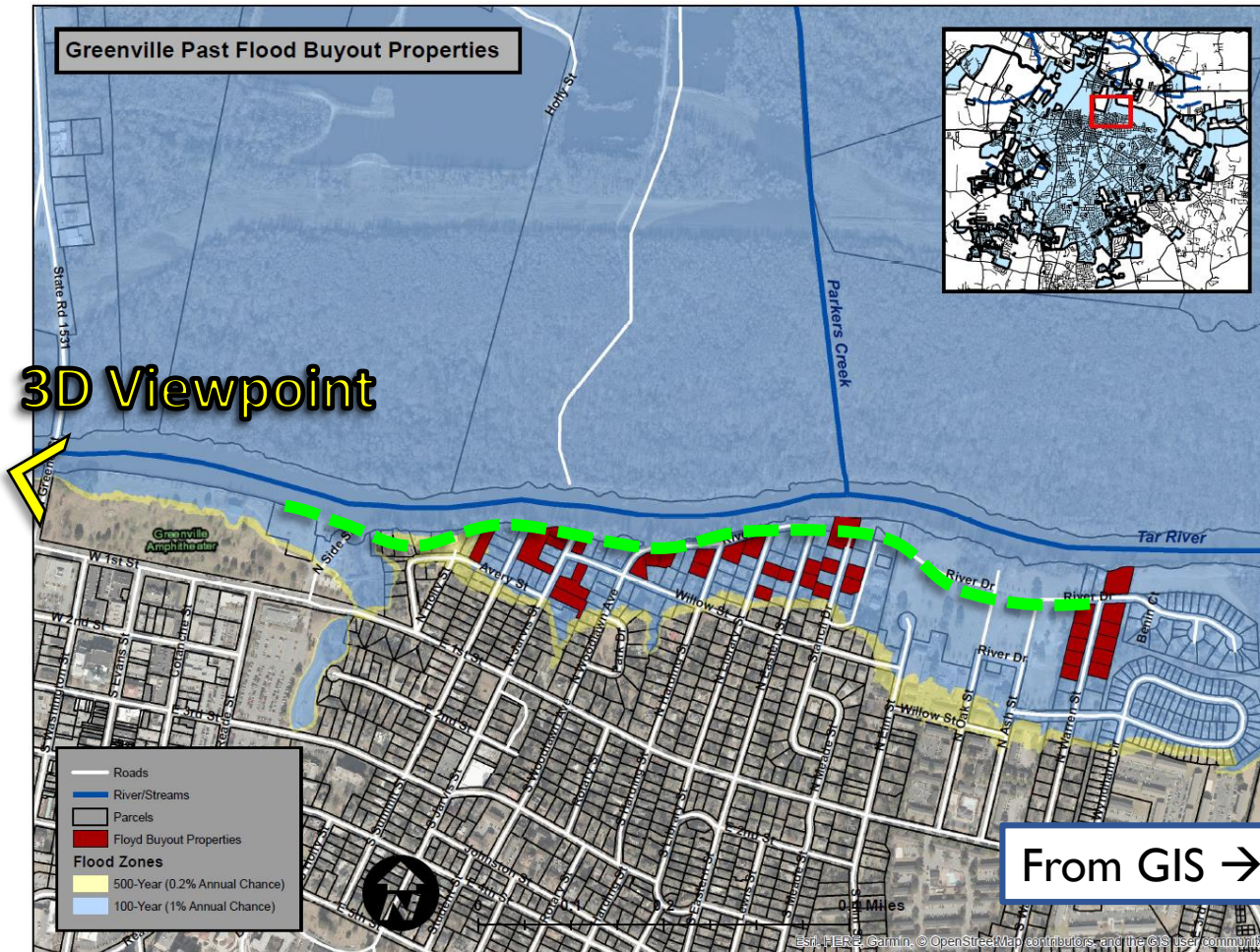
Buyout Spatial Patterns

The "Checkerboard Effect" in Greenville, NC

From GIS → Google Earth

Buyout Spatial Patterns and Implications

Connecting Greenspace & Greenways in Greenville, NC

Fiscal Impact Methods

Cost or Benefit	Variable of Interest	Method for Estimation
Benefit (+)	Annual Avoided Infrastructure Maintenance Costs	Determine cost per mile for maintenance from local budget, estimate % of neighborhood that had infrastructure removed
Benefit (+)	Avoided Disaster Response/Recovery Costs	If reimbursed = $0; Use estimates categorized by Emergency or Permanent Work (FEMA PA Program)
Cost (-)	Property tax revenue lost over time for municipality and county	Use proxy for assessed value pre-storm (sale price) multiplied by averaged historical tax rates, sum over time and adjust for inflation
Cost (-)	Annual cost to maintain buyout property (i.e., mowing, landscaping, etc.)	Obtain $$ figures from local public works and parks and recreation departments

(+) Annual Avoided Infrastructure Costs
(+) Avoided Disaster Response/Recovery Costs

(-) Property Tax Revenue Lost
(-) Maintaining Property
_____
= Total Fiscal Impact

ESTIMATION TOOL: FISCAL IMPACT OF FLOODPLAIN BUYOUTS FOR MUNICIPALITIES

Tab #1: Data Input

Instructions: Fill out the three following sections of data cells (colored light blue) below using best available data or estimates. Hover over any data entry cell for helpful comments about the definition and possible source of data.

Cell Color Key

| Light Blue : Enter Data (UNLOCKED) |
| Light Grey Cells: Calculations (LOCKED) |
| Green: Fiscal Gain (LOCKED) |
| Red: Fiscal Loss (LOCKED) |

Users must choose to enter data related to only one of the following models:

2) Past Buyouts Model: calculates estimated fiscal impact of historical buyouts up to current year

3) Prospective Buyout Model: calculates the estimated fiscal impact 10, 20, 30 or more years into the future

Suggesion: If wanting to use both models, save a separate excel workbook file and work on one model at a time.

Section #1

Municipality Overview

NOTE: All data should relate to what the municipality owns, operates, maintains, has jurisdiction over or is otherwise responsible for financially unless otherwise noted.

ID		Value	Unit	ID		Value	Unit
A	Population:		people	F	Municipal Property Tax Rate:		per $100 Assessed Evaluation
B	Total # of Housing Units:		units	G	County Property Tax Rate:		per $100 Assessed Evaluation
C	Total Road Length:		miles	H	Annual Roads Budget:		dollars
D	Total Water Pipe Length:		miles	I	Annual Water System Budget:		dollars
E	Total Sewer Pipe Length:		miles	J	Annual Sewer System Budget:		dollars

Section #2

Flood Impacts and Buyouts In Municipality

NOTE: Only enter data into **Section 2A (Past Buyouts) OR Section 2B (Prospective Buyouts)**

Estimates based on City of Lumberton, NC

Scenarios

Factors	Business as Usual	Relocation Policy	Lease Out & Partnerships	No PDD	Low Site Maintenance Costs	Best Case	Larger Buyout	Higher Avg. Home Value
% of infrastructure removed	0	0	0	0	0	0.2	2	0
average buyout price	$16,180	$16,180	$16,180	$16,180	$16,180	$16,180	$16,180	$50,000
size (# of properties)	21	21	21	21	21	21	200	21
$/acre for site maintenance	$1,400	$1,400	$1,400	$1,400	$250	$250	$1,400	$1,400
% area municipal-maintained	100	100	50	100	100	50	100	100
% relocated in municipality	10	95	10	10	10	95	10	10
% reimbursed for response/recovery costs	100	100	100	75	100	100	100	100
buyout property acreage	6.2	6.196	6.196	6.196	6.196	6.196	50	6.196
Net Fiscal Impact	-$65,725	-$11,843	-$61,388	$80,336	-$58,600.04	$387,456	$3,288,043	-$184,975

	Factors Influencing Effectiveness					
Municipality	Nature of Buyout		Characteristics of Property		Relocation	Costs Reimbursed	Long-term Result*
	Efficient/ Inefficient	Relative Size	Current Buyout Land Uses	% properties Leased to 3rd Party	% Within Municipality	% Reimbursed	Positive/ Negative
Charlotte	Efficient	Small	Amenity (Park)	ND	ND	ND	Positive
Raleigh	Efficient	Small	Amenity (Park), Vacant	ND	ND	ND	Positive
Greenville	Both	Medium	Amenity (Dog Park, Greenway), Vacant	30	25	~ 100	Positive
Rocky Mount	Both	Medium	Amenity (Park), Parking, Vacant, Reforested	<10	90	~ 100	TBD
Lumberton	Both	Medium	Amenity (Park), Vacant	0	20	~ 100	TBD
Kinston	Efficient	Large	Returned to Nature, Vacant	ND	97	ND	Positive
Windsor	Both	Medium	Amenity (Frisbee Golf), Vacant	<5	ND	> 80	Positive
Seven Springs	Inefficient	Large	Amenity (Park), Vacant	<10	0	~ 100	Negative

Findings

Fiscal impact of buyouts on municipalities depends on three factors:

1. Size and spatial distribution of the acquired properties

2. Relocation of buyout participants (inside or outside municipal boundaries)

3. Management of acquired properties (land use and party responsible for maintenance)

Recommendations

1. Plan for buyouts in advance; target homes for acquisition

2. Create incentives for homeowners to participate in buyout and relocate within the municipality

3. Acquire a sufficient number of contiguous properties to create a public amenity, e.g., a greenway or park

4. Look for opportunities to connect acquired lands to existing open space

5. Partner with third parties such as land trusts, state or local parks, ...to transfer site maintenance costs

Future Research

- Advance purchase of buyouts

- Impact of buyout on adjacent properties
  - Greenway, greenspace and other amenity increases property values
  - Vacant lots scattered around could reduce property values

- Physical and social dynamics in a coastal environment

Questions?

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Hurricane Irene (2011) Flooding
in Lincoln Park, New Jersey