

# StormSmart Coasts

Helping coastal communities cope with floods,  
storms, sea level rise, and climate change

## **Northeast Region Coastal Hazards Workshop**

**Daniella Hirschfeld**

NOAA CSC Coastal Management Fellow  
Massachusetts Office of Coastal Zone Management



**NOAA Coastal Services Center**  
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY



# Overview

- Background
  - Goals
  - Needs
- Current Status
  - Information Hub
  - Partnerships
  - Model Tools
- Future: Increasing Resiliency



**Background**

# The Monetary Burden

	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
Scituate	3,071	2,752 (13%)	0	319	\$49,629,842 (17.7%)
Revere	2,414	2,013 (9.5%)	3	398	\$14,358,062 (5.1%)
Marshfield	1,255	1,051 (5%)	1	203	\$13,487,809 (4.8%)
Hull	2,068	1741 (8.2%)	0	327	\$12,148,369 (4.3%)
MA Coasts Total	21,267	17,257 (81%)	12	4002	\$217,913,069 (78%)
MA Total	26,643	21,221	43	5,379	\$279,663,492

**Goal:**  
**Help Communities To Better Manage And Cope With:**



# Legally Defensible Actions

**Protects the rights of residents, businesses, and visitors by requiring that public & private projects do not:**

- pose a threat to public safety,
- increase flood or storm damage to public or private property
- strain municipal budgets by raising community expenditures for storm-damage mitigation, stormwater management, emergency services, and disaster recovery efforts.



# Options

**SEAFOOD** 170 Baht

- 993 Poached Cod & Parsley Sauce 220 Baht
- 994 Poached Red Snapper & Parsley Sauce 170 Baht
- 995 Mixed Seafood in a Basket 210 Baht
- 996 Fish Cakes 45 Baht

**SEAFOOD SPECIALS**

- 997 Sirloin Steak 180 Baht
- 998 Gammon Steak 180 Baht
- 999 Roast Chicken & Chips 160 Baht
- 1000 Bangers & Mash 120 Baht
- 1001 Spaghetti Bolognese 140 Baht
- 1002 Egg Chips & Beans 100 Baht

**www.fishandchipsbangkok.com**

**MINCED BEEF & ONION PIE** 170 Baht per set

- 997 Minced Beef & Onion Pie
- 998 Chicken & Mushroom Pie
- 999 Cheese, Potato & Onion Pie
- 1000 Cornish Pasty
- 1001 Traditional Steak & Kidney Pudding
- 1002 Cottage Pie 160 Baht

**ALL PIES CAN BE BOUGHT SEPARATELY FOR 100 Baht each**

**THE MODERN**

- 1003 Chips 50 Baht
- 1004 Regular Chips 50 Baht
- 1005 Large Chips 90 Baht
- 1006 Onion Rings 60 Baht
- 1007 Meshed Potato 50 Baht
- 1008 Mushy Peas 40 Baht
- 1009 Garden Peas 40 Baht
- 1010 Baked Beans 40 Baht
- 1011 Onion Gravy 20 Baht
- 1012 Curry Sauce 30 Baht
- 1013 Buttered Cumberland Sausage 45 Baht
- 1014 Black Pudding 40 Baht

**SALADS**

- 1015 Mixed Salad 30 Baht
- 1016 Tuna Salad 30 Baht
- 1017 Cheese Salad 110 Baht
- 1018 Ham Salad 100 Baht

**www.fishandchipsbangkok.com**

**CHEESEBURGER** 105 Baht

- 1009 Bacon Cheeseburger 105 Baht
- 1010 Blue Cheese Burger 110 Baht
- 1011 Chilli Burger 90 Baht
- 1012 Fish Burger 110 Baht
- 1013 Super Size Hot Dog 120 Baht

**ANY CARBON IN CRUST POTATOES** 120 Baht

**ANY CARBON IN CRUST POTATOES WITH TOPPING**

- 1014 Cheese Baked Beans
- 1015 Tuna & Sweetcorn
- 1016 Extra Topping

**WANT NOT TRY ONE OF OUR BRILLIANT THAI fillings**

- 1017 Thai Green Curry with Chicken
- 1018 Sweet & Sour Chicken
- 1019 Pork with Chilli & Basil
- 1020 Potato with Butter 30 Baht

**www.fishandchipsbangkok.com**

**Is the message**

**interesting?**

**relevant?**

**actionable?**





Interesting?

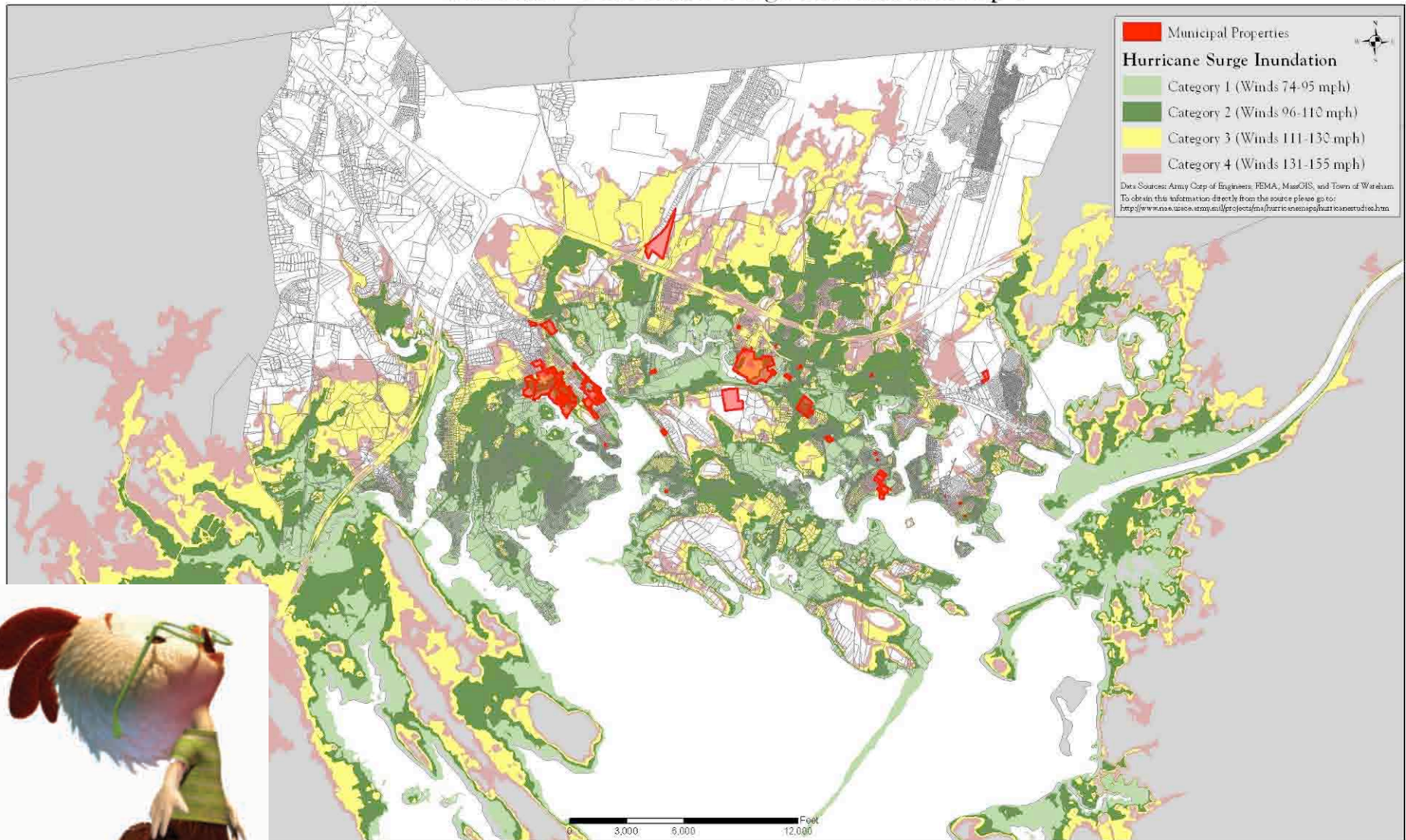


Relevant?



Actionable?

## Wareham - Hurricane Surge Inundation Map 1



rogram, 7870 Cranberry Highway, East Wareham, MA 02538. [www.buzzardsbay.org](http://www.buzzardsbay.org). May 2008.





# Interesting?



# Relevant?



# Actionable?



## RAISE YOUR HOME, LOWER YOUR PAYMENTS

Protect buildings and reduce mortgage and insurance payments with freeboard

### WHAT IS FREEBOARD?

#### WITHOUT FREEBOARD



Annual flood insurance: **\$4,139**

#### WITH 2' FREEBOARD



Annual flood insurance: **\$2,767**

**FREEBOARD** - Elevating the foundation of a building above predicted flood elevations by a small additional height (generally 1-3 feet above National Flood Insurance Program height requirements). While relatively inexpensive to add height during construction or reconstruction, the benefits are substantial—improved storm protection and in drastic reductions in flood insurance premiums (and in many situations, lower mortgage payments too).

### WHAT ARE THE BENEFITS OF FREEBOARD?

By elevating a building above National Flood Insurance Program (NFIP) height requirements (typically by 1-3 feet), you can realize these substantial benefits:

- **Increased protection from floods and storms.** Storm waters can and do get higher than those shown on Flood Insurance Rate Maps (FIRMs). Freeboard helps to protect structures against these larger storms, and allows for flood modeling and mapping uncertainties associated with FIRMs.
- **Better preparation for on-going sea level rise.** Sea level has risen in Massachusetts approximately 0.8 feet in the past 100 years. Since elevations on FIRMs do not include sea level rise, freeboard will help keep structures above flood waters as storm surge elevations increase.
- **Greatly reduced flood insurance premiums.** Because the Federal Emergency Management Agency (FEMA), which administers the NFIP, recognizes that freeboard reduces flood risk, it provides substantial (sometimes more than 50%) reductions in flood insurance premiums for structures incorporating freeboard. These savings can rapidly accumulate, especially over the life of a normal mortgage.

#### Example of savings on NFIP premiums with freeboard

	A Zone		V Zone	
	Annual savings in NFIP premiums	Savings over 30-year mortgage	Annual savings in NFIP premiums	Savings over 30-year mortgage
1' freeboard	\$502 (41%)	\$15,060	\$1,360 (62%)	\$40,800
2' freeboard	\$678 (55%)	\$20,340	\$2,730 (50%)	\$81,900
3' freeboard	\$743 (60%)	\$22,290	\$3,415 (62%)	\$102,450

NFIP premiums based on May 2007 rates for a one-floor residential structure with no basement, \$500 deductible, \$250,000 coverage, for the building \$100,000 for contents.

### WHAT ARE THE COSTS OF FREEBOARD?

The expense of incorporating freeboard into new structures is surprisingly low, generally adding only about a ¼% to 1 ½% per foot of freeboard to the total construction costs according to a 2006 FEMA-commissioned study (*Evaluation of the National Flood Insurance Program's Building Standards*). This often means that each foot of freeboard adds less than \$10 to a monthly mortgage payment, but can save homeowners over a \$100 a month on their NFIP premiums.

Consider, for example, a proposed one-storey building in the V zone that will cost \$250,000 to build at minimum legal standards (the NFIP requires that all homes in the floodplain be elevated to at least to the base flood elevation [BFE], mapped on FIRMs). According to the study cited above, adding each foot of freeboard to a home on piles or piers adds about 0.4% to total construction costs (about \$1,000 a foot in this example). If the owner takes out a mortgage at 6.5% APR for the total construction costs, he or she will actually pay less each month for the home after adding 3' of freeboard, even though the home, on paper, costs more to build.

#### Home at BFE

Monthly mortgage payments (at 6.5%)	\$1580.17
Monthly flood insurance	\$458.25
<b>Total monthly cost</b>	<b>= \$2038.42</b>

#### Home with 3' of freeboard

Monthly mortgage payments (6.5%)	\$1599.13 (+\$18.96)
Monthly flood insurance	\$173.67 (-\$284.58)
<b>Total monthly cost</b>	<b>= \$1772.80 (-\$265.62)</b>

In this example, adding 3' of freeboard saves homeowners \$265.62 per month, or \$95,623.67 over the life of a mortgage, and this doesn't include the potentially avoided flood damage (which could easily be tens of thousands of dollars more). Benefits in A Zones are generally less dramatic, but still substantial. To determine NFIP premiums for a specific property, see a licensed insurance agent.

### WHO CAN BENEFIT FROM FREEBOARD?

Everybody building in floodplains can protect themselves and their property and save on flood insurance by including freeboard into their construction and reconstruction projects. Additional benefits include:

- **For new homeowners** - Whether or not you live in the house year-round, having it elevated increases the chances that it will weather storms safely, decreasing your worry and protecting your investment. If you're building a new home, or doing a renovation, ask your builder/ designer about incorporating free board.
- **For builders/contractors** - Freeboard provides a competitive edge over other builders, allowing you to market the benefits of reduced flood insurance and flood risk to potential buyers. When doing retrofits (especially those requiring bringing structures up to current NFIP standards) explain the benefits of freeboard to your clients.
- **For municipalities** - When constructing new municipal buildings (schools, fire stations, etc.) use freeboard as a means of saving tax-dollars. Encourage all new construction in your community to include freeboard. (NOTE: the Massachusetts Attorney General's office has recently rejected bylaws requiring freeboard, but municipalities may promote its use).
- **For businesses** - Protect your buildings, important records, and inventory from flooding. Drastically decrease your recovery/clean-up time after storms, or better yet stay open during the storm. The Institute for Business and Home Safety reports that more than 25% of businesses that close due to storm damage never reopen.

### FOR MORE INFORMATION...

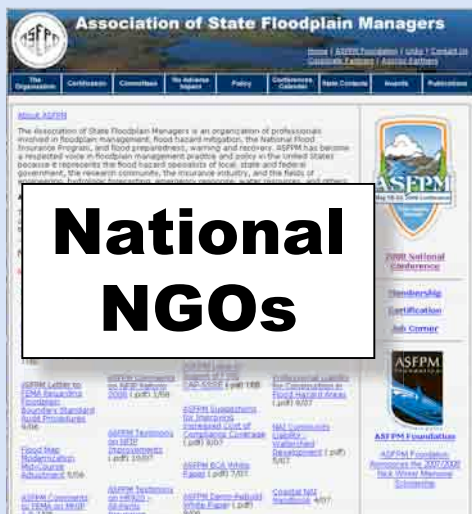
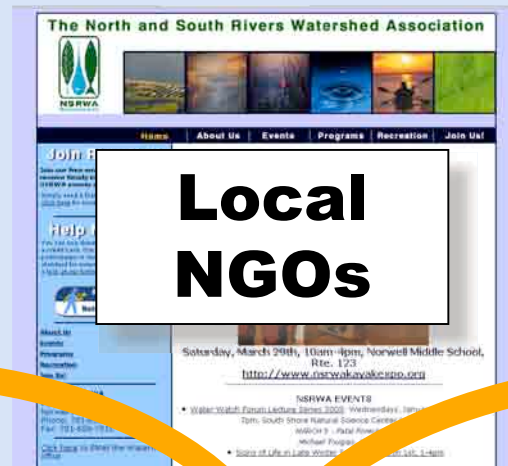
- For technical information on the costs of incorporating different flood-resistant building techniques (including freeboard), see the American Institutes for Research's 2006 *Evaluation of the National Flood Insurance Program's Building Standards* study at [www.fema.gov/library/newRecord.do?id=2592](http://www.fema.gov/library/newRecord.do?id=2592).
- For general information on the National Flood Insurance Program, see [www.FloodSmart.gov](http://www.FloodSmart.gov).
- For specific questions on flood insurance rates, see a licensed insurance agent.



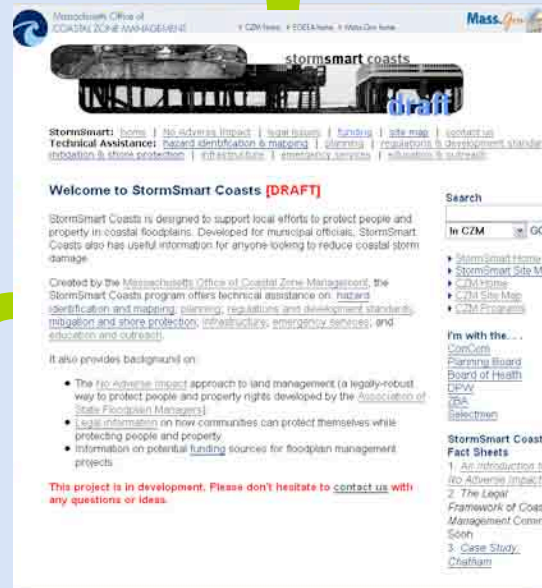
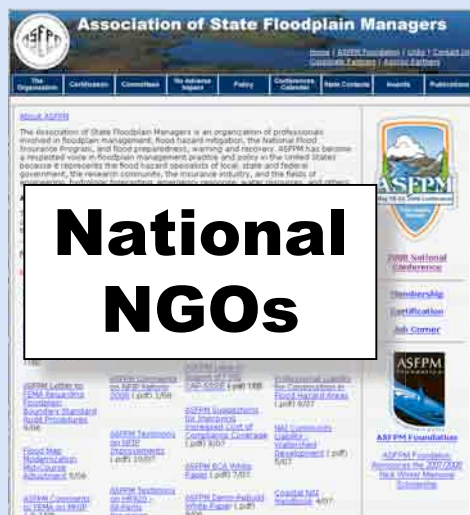
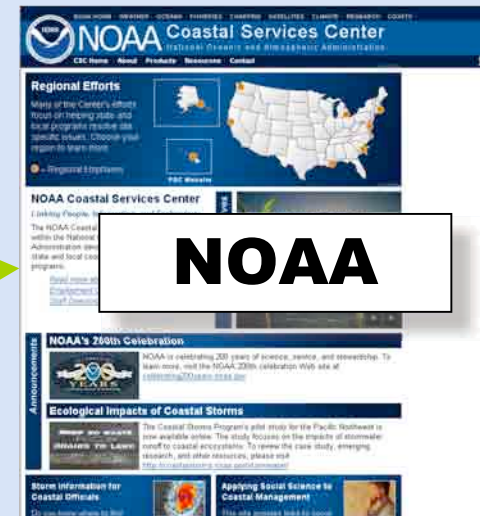
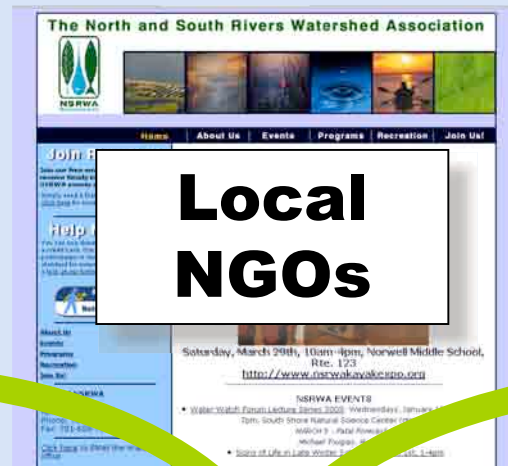
# Current Status



# Information Hub



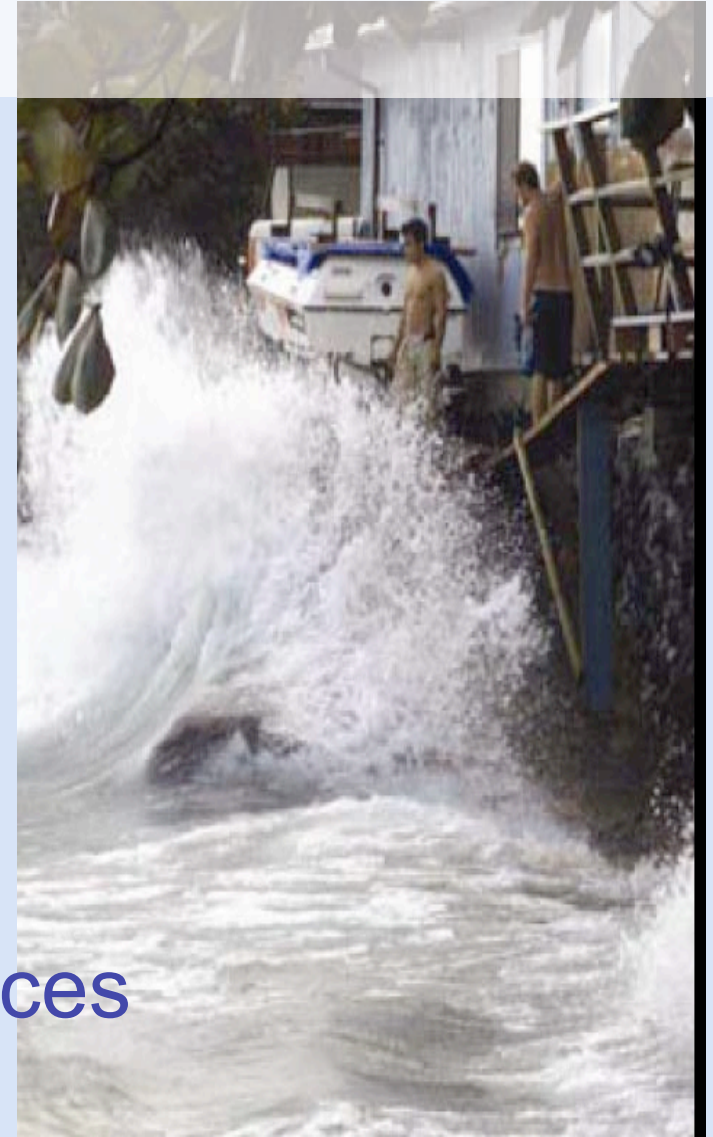
# Information Hub





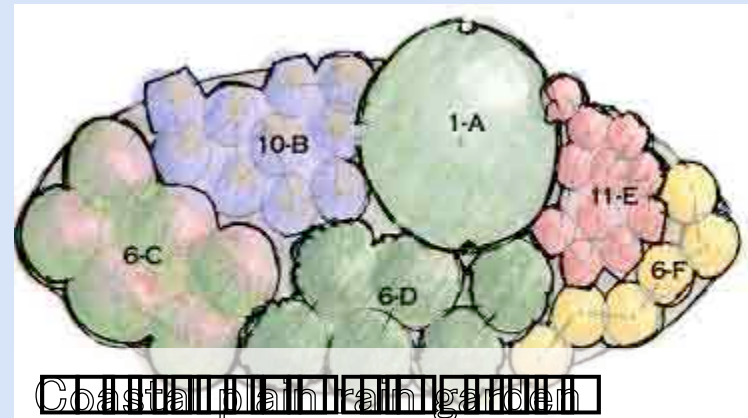
# Partnerships

- Pilot Communities
- Coastal Advisory Group
- Ongoing Transference
- Enhancing Current Resources



# Pilot Communities – Example Assistance

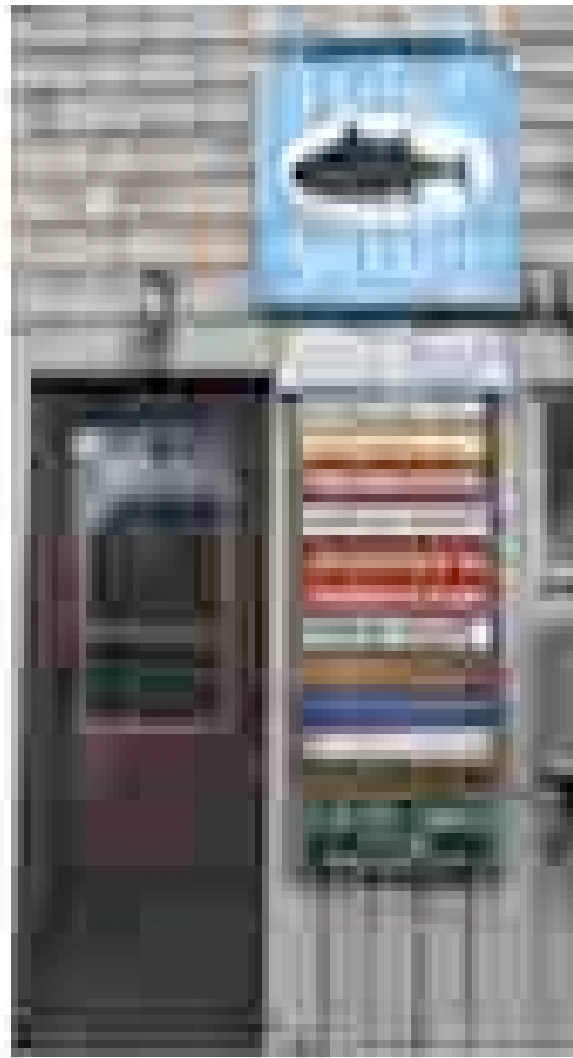
- Develop technical guidance and regulatory guidelines for coastal LID approaches, specific to coastal floodplains,
- Draft performance standards for new development and/or re-development.
- Draft suggested revisions to existing floodplain management bylaws and/or regulations to reflect the NAI approach.
- Evaluate mitigation measures for developed areas.
- Develop education and outreach strategies and materials, assisting in raising public awareness and acceptance of each tool and technique pursued



# Tools Offered

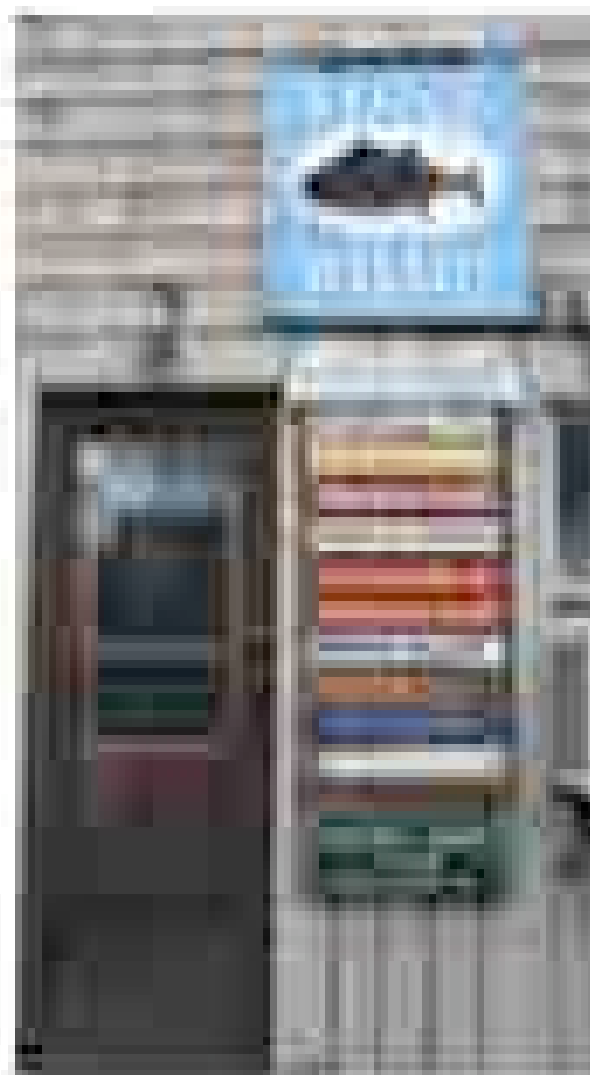
1. Hazard Identification and Mapping
2. Planning
3. Regulations and Development Standards
4. Infrastructure
5. Mitigation and Shore Protections
6. Emergency Services
7. Education and Outreach

# StormSmart Coasts Building Blocks



- ▶ Hazard Identification & Mapping
- ▶ Planning
- ▶ Regulations & Development Standards
- ▶ Mitigation & Shore Protection
- ▶ Infrastructure
- ▶ Emergency Services
- ▶ Education & Outreach

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# freeboard?





**~\$1,000 per foot  
of freeboard  
(+~\$18/month)**

## WITHOUT FREEBOARD



Annual flood insurance: **\$5499**

## WITH 3' FREEBOARD



Annual flood insurance: **\$2084**

( - \$284/month)

# Homeowner savings

	V Zone		A Zone	
	Annual savings in NFIP premiums	Savings over 30-year mortgage	Annual savings in NFIP premiums	Savings over 30-year mortgage
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**Future:**

**Increasing Resiliency**

		Benchmarks			
		Policy and Planning	Physical and Natural Capacity	Social and Cultural Capacity	Technical and Financial Capacity
Outcome Areas	Governance	Community development policies, plans and programs are implemented and monitored in a participatory and transparent manner.	Basic Services (i.e. water, transportation, security, etc.) are accessible to all sectors of society.	Participatory collaboration mechanisms among different sectors and various levels of government are established and used to manage for resilience.	Technical and financial support mechanisms are transparent, accountable and available to support planned community actions.
	Land Use and Structural Design	Land use policies and building standards that incorporate measures to reduce risks from hazards and protect sensitive habitats are established, monitored and enforced.	Critical infrastructure are located outside high risk areas and constructed to address risk from priority hazards.	Developers and communities incorporate risk reduction into the location and design of structures.	Education, outreach and training programs are established to improve compliance with land use policies and building standards.



# Governance

Metric	StormSmart
Community development policies, plans and programs are implemented and monitored in a participatory and transparent manner.	goal
Basic Services (i.e. water, transportation, security, etc.) are accessible to all sectors of society.	goal
Participatory collaboration mechanisms among different sectors and various levels of government are established and used to manage for resilience.	must
Technical and financial support mechanisms are transparent accountable and available to support planned community actions.	?



# Land Use and Structural Design

Metric	StormSmart
Land use policies and building standards that incorporate measures to reduce risks from hazards and protect sensitive habitats are established monitored and enforced.	Goal
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Developers and communities incorporate risk reduction into the location and design of structures.	Goal
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