

# Smart Growth + Coastal Hazards

## *Our Road to Local Climate Change Adaptation*



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**MA Office of Coastal Zone Management**

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# Background

- Home Rule state
- State laws grant decision making power to locals
- Local officials are volunteers
- Budgets and bylaws decided at town meetings
- Technical staff expertise - if any - varies from town to town
- Counties abolished
- State and local budgets constrained

# The MA CZM Approach

- **Regional Program**
- **Direct Technical Assistance**
- **Science to Policy to Tools for Real World Change**
- **Regulatory and Outreach Models**
- **Coalition Building**





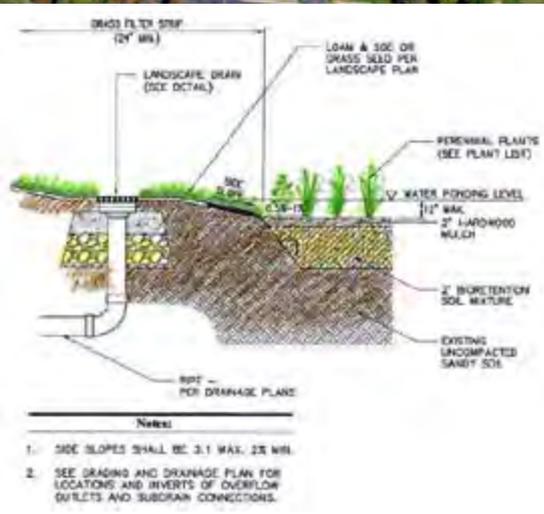
Modules

Slideshows

Case Studies

Model Bylaws

# Smart Growth Toolkit



- Low Impact Development
- Open Space Residential Design
- Traditional Neighborhood Development
- Transfer of Development Rights
- Transit Oriented Development

# Smart Growth Technical Assistance Teams and Partnerships



- Federal, state, and local agencies
- Conservation organizations
- Watershed associations
- Private consultants: engineering, planning, law
- Regional planning agencies
- Developers and realtors

# Climate Change Adaptation



What's smart growth got to do with my hazard areas?

# The Marriage of Smart Growth & Coastal Hazards



**"Introducing Mr. and Mrs. Floodplain Management"**



storms



flooding



sea level rise/climate change

**And their first born child *StormSmart Coasts***

# 2006 – 2008 Coastal Management Fellow Wes Shaw



# Storm Smart Coasts: Phase 1

## Technical Assistance Tools

- Hazard Identification and Mapping
- Planning, Bylaws, and Development Standards
  - Smart Growth
  - No Adverse Impact
  - Hazard Mitigation
- Mitigation and Shore Protection
- Infrastructure
- Emergency Services
- Education and Outreach





Interesting?



Relevant?



Actionable?



2001



2006





Interesting?

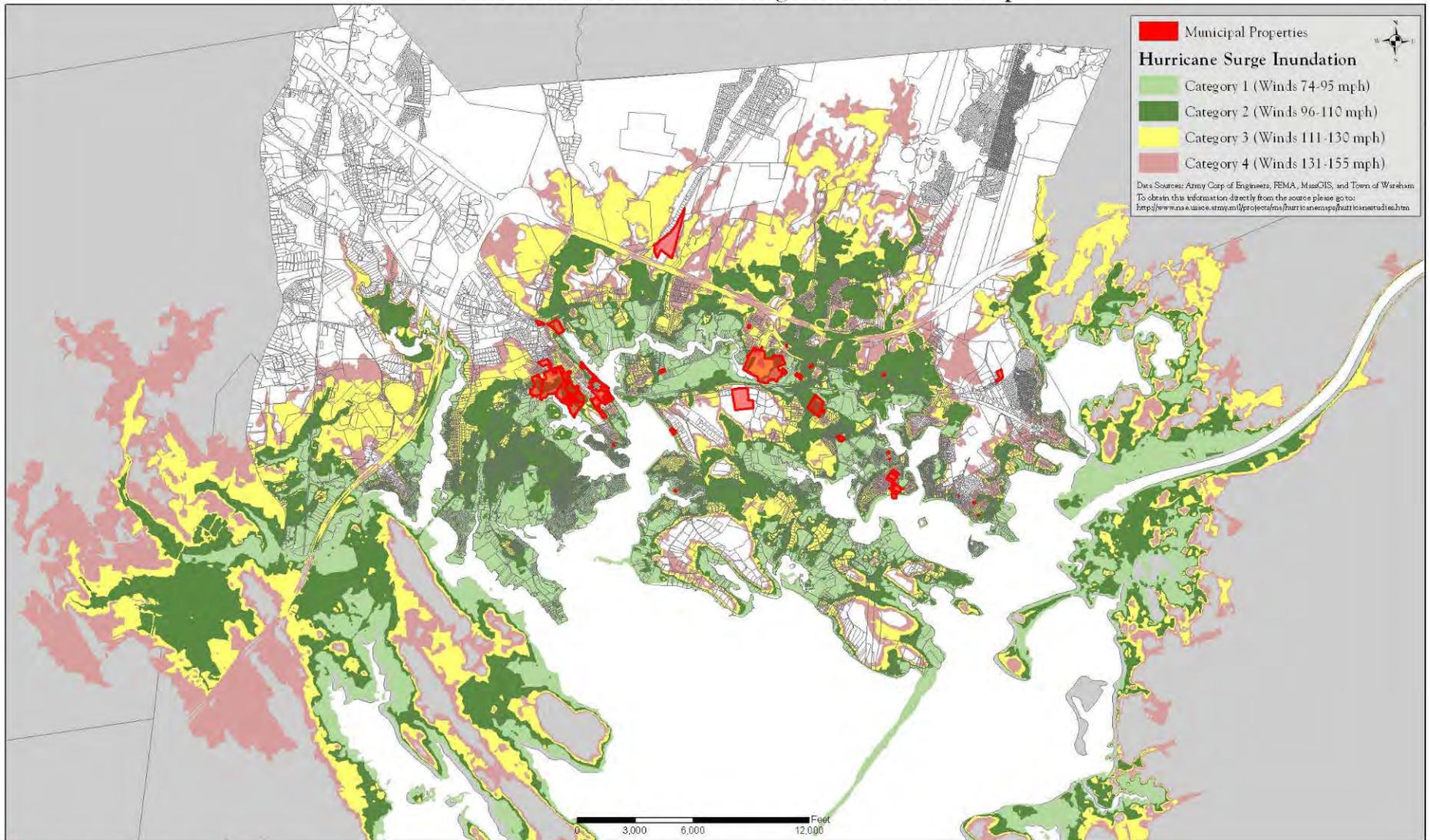


Relevant?



Actionable?

### Wareham - Hurricane Surge Inundation Map 1





Interesting?



Relevant?



Actionable?

### GENERAL MITIGATION GRANT PROCESS

1. Municipality designs a program with assistance from MEMA



2. Municipality advertises to find interested property owners



3. Municipality works with each applicant to find best mitigation option & assembles joint application



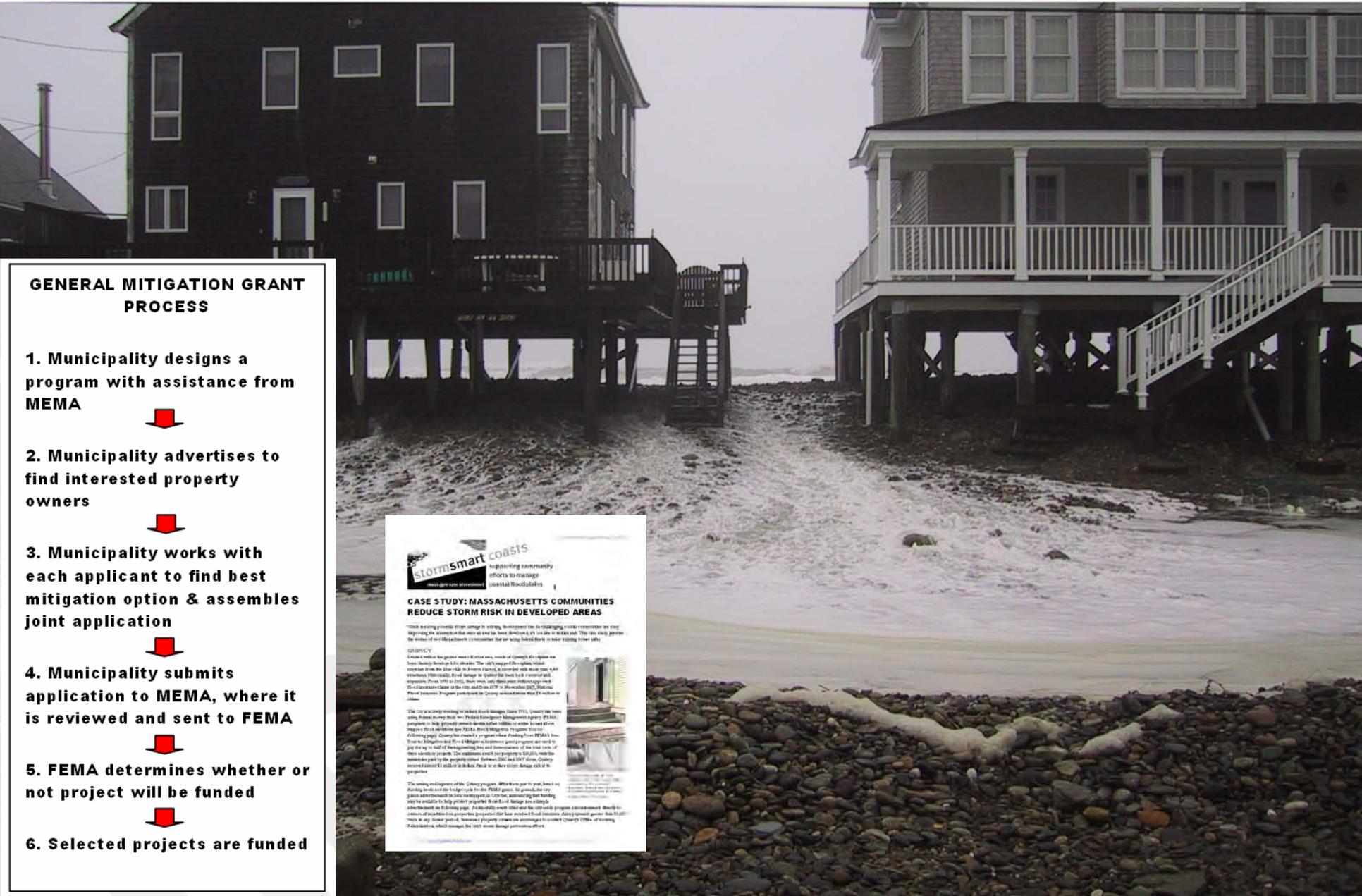
4. Municipality submits application to MEMA, where it is reviewed and sent to FEMA



5. FEMA determines whether or not project will be funded



6. Selected projects are funded



# 1

## Gather existing resources

**StormSmart:** [home](#) | [No Adverse Impact](#) | [legal issues](#) | [funding](#) | [site map](#) | [contact us](#)  
**Technical Assistance:** [hazard identification & mapping](#) | [planning](#) | [regulations & development standards](#) | [mitigation & shore protection](#) | [infrastructure](#) | [emergency services](#) | [education & outreach](#)

### Welcome to StormSmart Coasts

The StormSmart Coasts program is designed to help people working in coastal communities address the challenges arising from storms, floods, sea level rise, and climate change, and provides a menu of tools for successful coastal floodplain management.

#### StormSmart Coasts Building Blocks



- ▶ [Hazard Identification & Mapping](#)
- ▶ [Planning](#)
- ▶ [Regulations & Development Standards](#)
- ▶ [Mitigation & Shore Protection](#)
- ▶ [Infrastructure](#)
- ▶ [Emergency Services](#)
- ▶ [Education & Outreach](#)

#### Background & Resources



- ▶ [No Adverse Impact](#) (how to protect people and property rights)
- ▶ [Legal Information](#)
- ▶ [Funding Sources](#)
- ▶ [StormSmart Coasts News](#)
- ▶ [About StormSmart Coasts](#)

#### Where to Begin



#### I'm with the...

- ▶ [Board of Health](#)
- ▶ [Board of Selectmen](#)
- ▶ [Building Department](#)
- ▶ [Conservation Commission](#)
- ▶ [Department of Public Works](#)
- ▶ [Planning Board](#)
- ▶ [Zoning Board of Appeals](#)

#### Search

  
In CZM 

- ▶ [StormSmart Home](#)
- ▶ [StormSmart Site Map](#)
- ▶ [CZM Home](#)

#### **No Adverse Impact (NAI)**

A legally defensible do-no-harm approach to coastal land management

#### StormSmart Coasts Fact Sheets

*An Introduction to No Adverse Impact* (PDF, 5.4 MB)

*The Legal Framework of Coastal Management* (PDF, 1.9 MB)

*Case Study: Chatham* (PDF, 5.5 MB)



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Technical Assistance: hazard identification & mapping | planning | regulations & development standards
mitigation & shore protection | infrastructure | emergency services | education & outreach

Interpreting FIRMs and FIS reports

As a part of the National Flood Insurance Program (NFIP), the Federal Emergency Management Agency (FEMA) periodically conducts Flood Insurance Studies (FISs) and uses the results of these studies to produce FIS reports and Flood Insurance Rate Maps (FIRMs). FIRMs show the estimated extent of flooding during a hypothetical "100-year storm" (also called a 1% storm)—a storm that has an estimated 1% chance of being equaled or exceeded during any given year. (Note: a 100-year storm can occur more than once a century.)

Correctly interpreting FIRMs and FIS reports can be complicated. Following are some resources to help.

- The Massachusetts Office of Coastal Zone Management article, The Art and Science of Identifying Flood Zones.
The FEMA introductory fact sheet, Using a Flood Insurance Rate Map (FIRM).
An animated FEMA tutorial on FIRMs.
The FEMA Map Services Center maintains copies of all FIRMs and FIS reports.
FEMA's FIRMette tutorial provides instructions for determining the flood designation for an individual parcel by creating a "FIRMette" (a section of a FIRM for a specific address or location).
The National Flood Insurance Program website has information on FISs, FIRMs, and other floodplain management issues.
Contact Richard Zingarelli, Massachusetts NFIP Coordinator at Richard.Zingarelli@state.ma.us or (617) 626-1406 for more information on these and other NFIP topics.

Collage of resources including: 'The Art and Science of Identifying Flood Zones' article, FEMA 'Using a Flood Insurance Rate Map (FIRM)' fact sheet, FEMA FIRMette tutorial, FEMA Map Service Center, and National Flood Insurance Program website.

Contact Richard Zingarelli, Massachusetts NFIP Coordinator at Richard.Zingarelli@state.ma.us or (617) 626-1406 for more information on these and other NFIP topics.

The image shows a grid of 134 page thumbnails, numbered 1 through 134. The thumbnails are arranged in 11 rows and 12 columns. The content of the pages varies, including text, tables, charts, and diagrams. The thumbnails are small and somewhat blurry, but they clearly show the layout and content of each page in the document.

# 2

## Adapt as necessary



**FloodSmart** CAMPAIGN  
empowering communities,  
 reducing the damage  
 caused by flooding

### 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 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 all owners 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 (60%)	\$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, \$699 deductible, \$50,000 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 1/4% to 1 1/2% 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-story 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		Home with 3' of freeboard	
Monthly mortgage payments (at 6.5%)	\$1580.17	Monthly mortgage payments (6.5%)	\$1599.13 (+\$18.96)
Monthly flood insurance	\$458.25	Monthly flood insurance	\$173.67 (-\$284.58)
<b>Total monthly cost</b>	<b>= \$2038.42</b>	<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 freeboard.
- **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?rd=2592](http://www.fema.gov/library/newRecord.do?rd=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.



# 4

## Deliver resources to communities

- Establish pilot communities
- Provide direct technical and outreach assistance for implementation
- Ensure transference
- Enhance tools and website



**2008-2010 Coastal Management Fellow Daniella Hirschfeld**



**And then we lure  
another  
unsuspecting  
Coastal  
Management  
Fellow into our  
web....**



# SSC Phase 2 Local Implementation

## *The Test Drive*

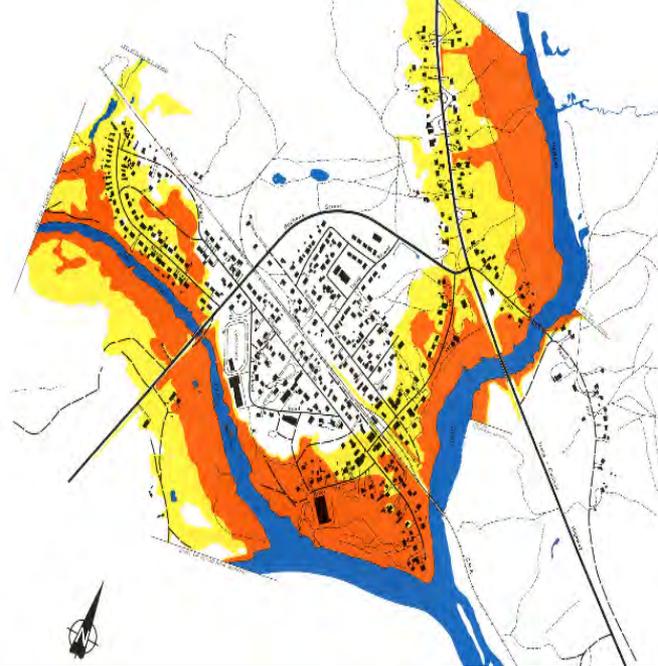
- Local Climate Change Adaptation
- Transferable products/models/successes
- Pilot project technical assistance teams
- Protection of habitat and resource areas; local and regional economies; public safety; public and private infrastructure; and recreational opportunities
- Competitive RFR process to choose 5 pilot projects with 7 host communities



# Community Requests

- **Multi-objective comprehensive hazard mitigation plan**
- **Identification of most vulnerable hazard areas in Boston**
- **Review of existing and adoption of new regulatory bylaws/codes**
- **Community wide outreach program, targeting local officials, homeowners, engineers, developers, and businesses**
- **Visualization of inundation of critical coastal facilities due to flood events and sea-level rise**
- **Assessment of hybrid/soft alternatives to armoring/seawalls**
- **Vulnerability assessment for barrier beach breaching**

# Smart Growth



- Require new public infrastructure out of hazard-prone areas
- Incorporate National Flood Insurance Program (NFIP) requirements into bylaws/regulations
- Create permanent no-build areas or incorporate TDR
- Integrate Low Impact Development site design and BMPs
- Develop incentives and design standards for retrofitting existing structures
- Establish incentives for freeboarding to elevate structures above predicted floodwaters



# Coastal Advisory Group boards/depts. from pilot communities

- Share progress and problem solve
- Receive and provide feedback at critical project phases and resolving local concerns at an early stages
- Reach consensus, and ensure long-term stewardship
- Empower the various local boards and departments by sharing experiences



# Ongoing Transference

- CZM regional networks of local officials
- Case studies, including problem resolution and keys to success.
- Blueprint for successful implementation nation wide.
- Enhancement of the tools and website based on the real-world experiences



**So, stay tuned for  
more exciting  
adventures in  
Nana's world!**

