TOWN OF MARSHFIELD

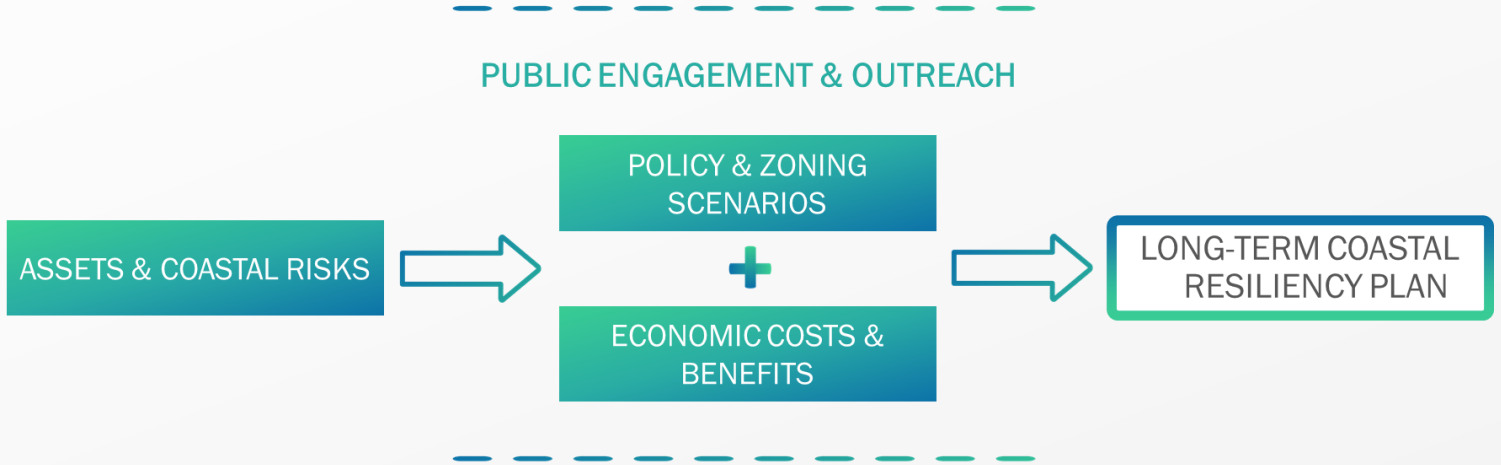
Long-term Coastal Resilience Plan

Select Board Meeting

June 28, 2022

Project Overview

The goal of the Marshfield Long-Term Coastal Resilience Plan is to develop guiding principles and recommended policies and zoning to proactively reduce future coastal flooding and erosion vulnerabilities and, if necessary, rebuild in a more resilient way after a future catastrophic event.



The project will NOT focus on engineering strategies like seawalls or beach nourishment.

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Roadmap

Community Workshop and online survey

62 people participated in each

Estimate costs and benefits of "no action"

Develop policy alternatives based on risks, workshop and survey results

Estimate costs and benefits of policy alternatives

Additional public outreach and engagement

May 26, 2022 public meeting

Develop draft recommendations

Finalize plan (June 2022)

WE ARE HERE

Community Workshop & Survey Summary

Most participants from the Planning Area are:

1. Aware and very concerned about coastal flooding, sea level rise, and impacts
2. Taking several no/low-cost actions to reduce their risks
3. Willing to consider taking substantial voluntary actions to reduce their risks, like elevating their buildings
4. Likely to take substantial actions if they incur high or frequent flood damage and loss, or are provided with financial support and incentives
5. Supportive of the Town spending money to improve and maintain neighborhood flood protection infrastructure – seawalls, revetments, drainage and pumping, raised roadways, beach nourishment, coastal dunes (not the focus of this project)

Participants from outside the Planning Area are concerned about:

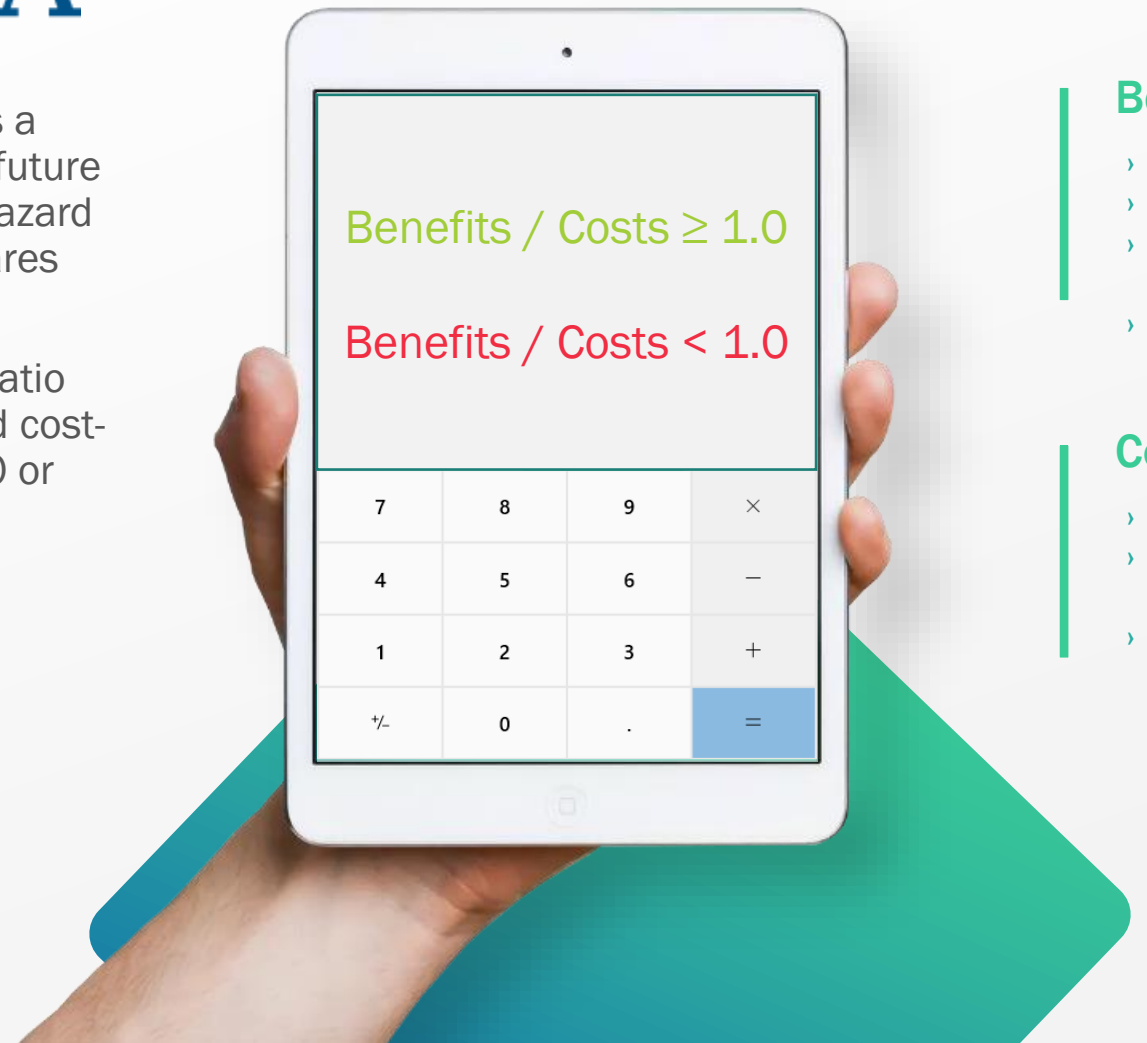
1. Town infrastructure spending in coastal areas vs other parts of Town
2. Allowing continued floodplain development and subsidizing risky private decisions
3. “Fighting a losing battle” with sea level rise and mother nature

Benefit-Cost Analysis to evaluate cost-effectiveness

FEMA

Benefit-Cost Analysis (BCA) is a method that determines the future risk reduction benefits of a hazard mitigation project and compares those benefits to its costs.

The result is a Benefit-Cost Ratio (BCR). A project is considered cost-effective when the BCR is 1.0 or greater.



Benefits

- Avoided damage/loss
- Environmental benefits
- Avoided emergency response, cleanup costs*
- Insurance costs*

*not included in our BCA

Costs

- Construction costs
- Engineering, real estate, legal, management costs
- Loss of tax revenue

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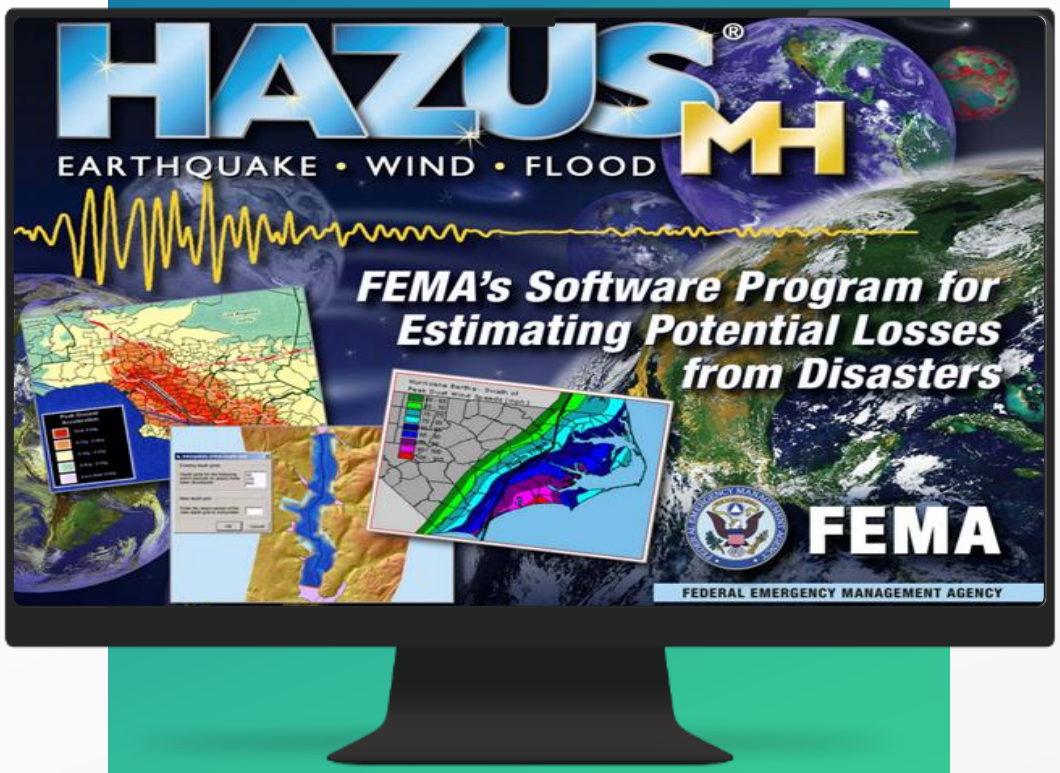
Estimating damage/loss with Hazus



FEMA's Hazus Program provides standardized tools and data for estimating risk from floods and other hazards.

Hazus models combine expertise from many disciplines to create actionable risk information that increases community resilience.

USER INPUTS

Building Inventory

- Area, stories, foundation type, basement, first floor height above ground, replacement value

Flood Depth Maps

- Massachusetts Coast Flood Risk Model
- Time horizons: 2030, 2050
- Return periods: 10-, 20-, 50-, 100-, 500-year

HAZUS OUTPUTS

Direct Damages

- Cost to repair/replace damaged buildings, contents, and inventories

Time-Dependent Losses

- Temporary relocation expenses
- Rental income loss
- Capital related loss
- Income loss
- Business interruption

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Costs of Inaction - Damage and Loss

Metric	Flood Return Period	Damage & Loss by Time Horizon 2030	2050
Number of Buildings Damaged	10-year	1,100	1,400
	500-year	1,500	1,700
Total Value of Damage/Loss	10-year	$105 million	$176 million
	500-year	$211 million	$388 million
Average Annual Damage/Loss	N/A	$11 million	$16 million

Mitigation strategies and cost-effectiveness results

Elevation (Residential)

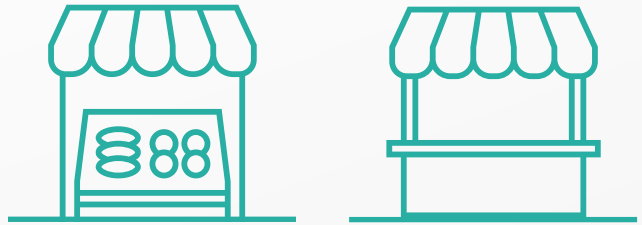
Cost-effective to require substantially damaged buildings to elevate higher than the State Building Code minimum

Elevation projects may be eligible for federal grants

Voluntary Acquisition & Regulatory Taking/Eminent Domain

Acquisitions and Eminent Domain are generally not cost-effective due to high property values

Restricting floodplain redevelopment is unlikely to be judged a Regulatory Taking. Technically, cost-effective for the Town, but not socially cost-effective



Dry Floodproofing (Non-Residential)

Cost-effective for half of all non-residential buildings, lots of damage and loss can be avoided

Dry floodproofing projects may be eligible for federal grants

Under all cost-effective mitigation scenarios, there were still 10's of $ millions in residual, unmitigated losses.
FLOOD INSURANCE IS CRITICAL!

Importance of Flood Insurance

- In the 2050 500-year flood, only 3% of residential buildings damaged and 7% of residential buildings' contents damaged would exceed the maximum NFIP flood insurance coverages for buildings ($250k) and contents ($100k).
- If 100% of buildings at risk were insured to the max, 89% ($133 million) of total building damages and 84% ($62 million) of total contents damages would be covered by insurance, less deductibles.
- If 100% of substantially damaged buildings had Increased Cost of Compliance coverage, up to an additional $49 million ($30k per structure) would be available to owners to help elevate upon rebuilding.
- Yet as of 2018, only about 50% of buildings in the FEMA floodplain were insured in Marshfield.
- In our survey, only 55% of respondents stated they had adequate flood insurance.
- This is a red flag – the community at-large and hundreds of households are not financially prepared.

Recommendation #1 – Promote Flood Insurance (More)

1. Continue and increase Community Rating System (CRS) participation to maintain or improve flood insurance discounts and make coverage more affordable.
2. Update CRS Program for Public Information and include updated Flood Insurance Coverage Assessment and Coverage Improvement Plan.
3. Survey uninsured property owners to understand barriers and develop messages and projects for Coverage Improvement Plan.
4. Create additional flood insurance outreach projects: direct mailings of brochures, flood insurance meetings, better advertise free technical assistance, incorporate damage and loss estimates, and promote Increased Cost of Compliance coverage, host flood insurance clinic for one-on-one support.
5. Investigate a parametric community wide flood insurance option.

Recommendation #2 – Establish Higher Elevation Standards

1. Wetlands Protection Bylaw
   - Add coastal resilience to list of interests in purpose.
2. Wetlands Protection Regulations
   - Add to performance standards for Land Subject to Coastal Storm Flowage (LSCSF): no habitable space or building utilities below 13 ft NAVD88; update sea level rise projections.
   - Modify buffer zone definitions and performance standards: do not exclude LSCSF; extend no habitable space/utilities below 13 ft NAVD88 to LSCSF buffer zone.
   - After MassDEP updates its regulations, adopt a new Coastal Resilience Article following Cape Cod Commission model.
3. Floodplain Zoning
   - Add coastal resilience to purpose.
   - Provide comprehensive application requirements to aid in permit reviews.
   - Add standard limiting uses below 13 ft NAVD88 to access, storage, and parking.
   - Add standard prohibiting new, substantially improved, or enlarged high risk buildings and uses.
   - Add special permit finding approval requirement for coastal resilience.
4. Create a set of building elevation case studies for typical and challenging conditions to help contractors understand how to construct elevation projects in Marshfield's coastal context.

Recommendation #3 – Increase Building Heights for Elevation Projects

Currently, only the difference between older and newer FEMA base flood elevations can be added to building height for flood mitigation projects.

Modify building height definition:

- To be measured from minimum elevation in State Building Code, including required freeboard, OR 13 ft NAVD88, whichever is higher
- For all new construction, substantial improvements, expansions and new/expanded uses in Floodplain Zoning Overlay, LSCSF and Buffer Zone
- Only for the portions of new or modified structures and uses that meet flood-resistant design and construction standards and Wetlands Protection restrictions on habitable space and utilities below 13 ft

Recommendation #4 – Pursue Federal Grants for Elevation and Dry Floodproofing

1. Publicize and recruit participants for the FEMA Flood Mitigation Assistance and Hazard Mitigation Grant Program targeting list of potentially cost-effective structures. These programs offer 75 federal/25 non-federal cost-share. Applications are due October 9, 2022. Town only has capacity to support up to a few property owners per year. Consider hiring a contractor to increase grant application and administration capacity.
2. Request US Army Corps of Engineers (USACE), New England District, to conduct a Hurricane and Storm Damage Reduction Feasibility Study for elevation and dry floodproofing in the entire Planning Area under Section 103 continuing authorities. If approved, up to $100k would be federally funded, with costs in excess shared 50/50. Implementation costs, if approved, would be split 65 federal/35 non-federal, with a $10 million cap on federal costs (total project costs of max $15.4 million). USACE manages projects, reducing limitations of Town staff capacity.
3. Create a low-interest revolving loan fund for property owners in Marshfield to help finance the non-federal match for federal elevation and dry floodproofing grant projects.

Recommendation #5 – Create a 30-foot setback from public [and private] seawalls

Most repetitive loss properties in Marshfield are located along the seawalls and damage historically caused by wave overtopping and storm damage/erosion induced seawall failure.

Elevation alone will not mitigate prevalent wave overtopping damage and safety risks, including water, stones, and debris launched over seawalls/revetments or structural failure due to seawall failure.

R-3 Waterfront Residential district already has a 30-foot rear yard requirement, but may not be referenced to seawall and may be waived or varied through Zoning Board of Appeals.

Recommendations:

1. Modify Chapter 217 (Seawalls) to prohibit structures "…on, over, or within 30 feet of seawalls and revetments…" with approval by Select Board
2. Consider rescinding existing exemption for private seawalls, since the risks are the same
3. Reduce the minimum front yard setback for parcels subject to the 30-foot seawall setback from 15 to 5 feet, provided no new or existing structure is located in the seawall setback

Recommendation #6 – Prepare a Substantial Damage Management Plan

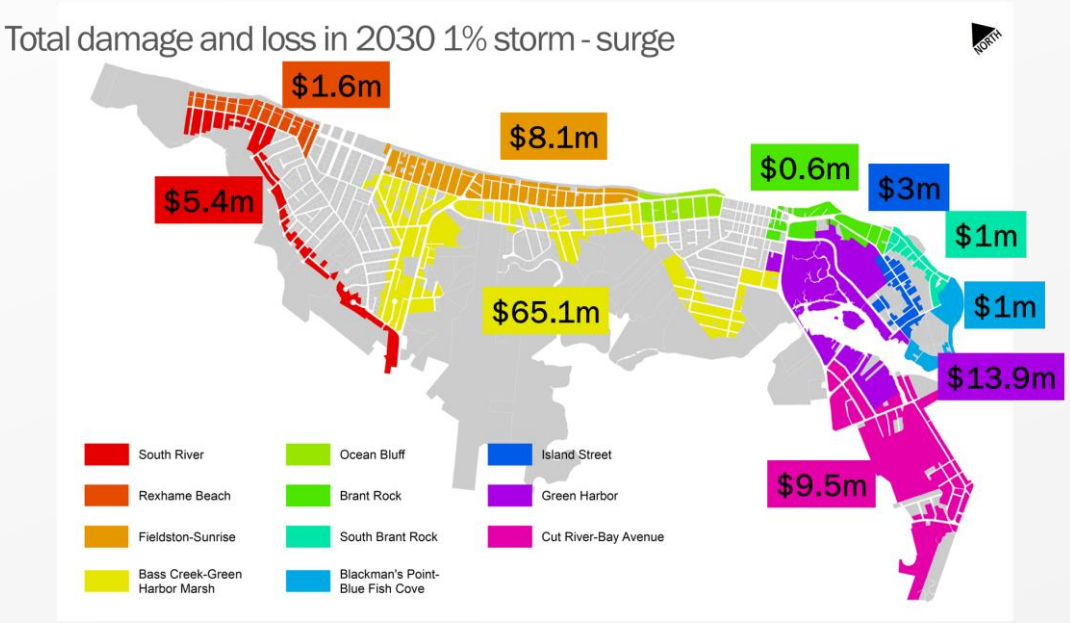
- New and substantial Community Rating System credits are now available for this activity, helping to maintain or improve flood insurance discounts and make coverage more affordable.
- Describes the community's process for evaluating damage to buildings and addressing those that have been substantially damaged, as required by NFIP.
- Outlines community responsibilities, identifies available data about buildings in the floodplain, describes community's approach to damage estimation, and lists steps community will take if buildings are determined to be substantially damaged.
- Partial credit may be attainable for the property database developed and used for the damage and loss estimation performed for this project.

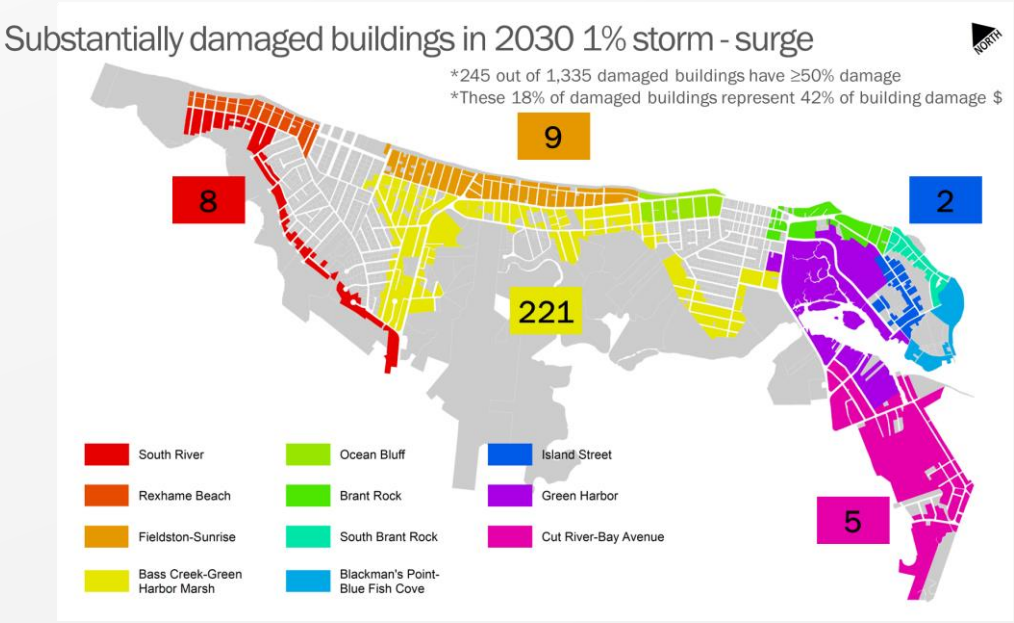
Recommendation #7 – Develop Flood Warning and Response Capabilities

- Significant Community Rating System credits are available for this activity, helping to maintain or improve flood insurance discounts and make coverage more affordable
- Creates the capabilities to recognize an imminent threat to the community, a plan that provides for warning the affected populations, the activation of community emergency response efforts, and giving special attention to critical facilities.
- We heard from residents who were impacted during floods (e.g., totaled vehicles) where they could have taken protective actions if they had received early warning about flood threats and emergency response actions (e.g., closing flood gates).
- Early warnings could give time for residents and business owners to take protective actions to minimize damage to buildings, contents, inventories, and other assets.
- Early warnings and protective actions at critical facilities could reduce downtime and associated economic impacts after a flood.

Recommendation #8 – Pursue Federal Grants for Dyke Road

- There are significant benefits (avoided damage and loss) against which to budget costs for increasing the flood protection provided by Dyke Road.
- Develop and submit a FEMA Building Resilient Infrastructure and Communities (BRIC) grant application for FY22.
- If construction costs appear to be less than $15 million, consider adding the evaluation of elevating Dyke Road to the request for USACE to conduct a Hurricane and Storm Damage Reduction Feasibility Study (Recommendation #4)





Thank you

Questions & Discussion

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