

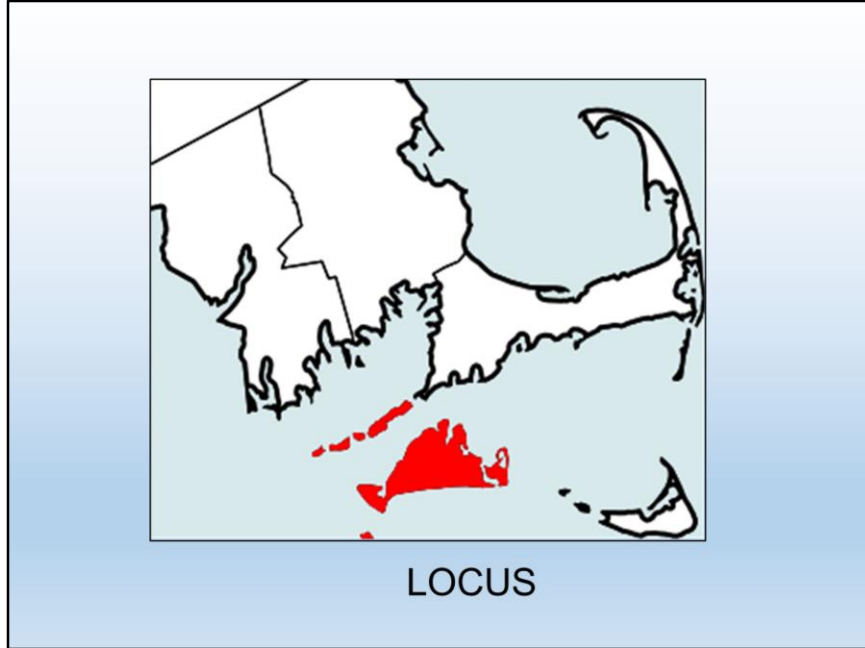
SUMMIT ON CLIMATE RESILIENCY  
December 4, 2015

Presentation by  
Jo-Ann Taylor  
Coastal Planner  
Martha's Vineyard Commission





Now that's resilient. Making it work.



Refreshing take on planning area. This is my favorite locus. Boston isn't even on this view, never mind at the center.

## RESILIENCY PLANNING

### HAZARD MITIGATION PLANS

- Planning Grants through MEMA/FEMA
- Outreach and Consensus Building
- 75% Federal Funding for Implementation

Funding available for planning and implementation. Great opportunity for consensus building.



The carrot for the towns is the 75% federal match for implementation.

## RESILIENCY PLANNING

### HAZARD MITIGATION PLANS

- Focus on natural hazards
  - Flood (Nor'easter, rainstorms)
  - Storm (Hurricane, storm surge)
  - Drought and Wildfire
- Many exacerbated by climate change, especially with SLR

## RESILIENCY PLANNING

### HAZARD MITIGATION PLANS

#### GAPS

- Wetlands
  - Not immediately critical to human safety
- Long term planning for Sea Level Rise
  - Not immediately critical to human safety

The focus is on human lives and health, and economic concerns. Hopefully not too many people or buildings in harm's way in wetlands. Plans focus on 5-year intervals. SLR planning looks beyond 5 years. Unless IQs drop dramatically, people should be able to outrun SLR, so the vulnerability is not as critical. Recognizing the limits, Hazard Mitigation Plans are still a pretty good approach to resiliency planning.

## RESILIENCY PLANNING

- **Vulnerability Assessment**
  - Good data and outreach
- **Mitigation**
  - Evaluate and adopt strategies

Adaptation to climate change is approached by both vulnerability assessment and mitigation. These are both essential, but very different in both approach and reception. Assessment of impacts may be a bit dry, but at least it's fairly bloodless. Good vulnerability assessment, followed by blitz outreach, sets the stage selection of mitigation strategies. The fur flies when we start talking about mitigation strategies. This is where all that good data and outreach pay off.



## VULNERABILITY ASSESSMENTS



### STORM SURGE

Loss of life and property damage

Most of the loss of life and property damage in a hurricane happens during the initial onslaught of storm surge. This comes up rapidly and leaves people with nowhere high enough to go.



## VULNERABILITY ASSESSMENTS



First Responders Love the SLOSH maps

Chappaquiddick Fire Station. Gotta get this data out into the community.

**Edgartown Hurricane Inundation Vulnerability (SLOSH)**  
 Based on preliminary data Released by the USACOE New England District in March 2013  
 Developed Land

SLOSH cat.	Use	# People (other)	# People (July-Aug)	# Buildings	Approx. Value
		2.25 per building	4.14 per building		
1	Residential	95	174	42	\$32,877,400
	Commercial			13	\$19,552,000
	Industrial			0	\$0
	Municipal, Public, Non-profit			2	\$368,100
2	Residential	468	861	208	\$154,264,300
	Commercial			7	\$11,682,800
	Industrial			0	\$0
	Municipal, Public, Non-profit			1	\$764,700
3	Residential	790	1453	351	\$261,434,400
	Commercial			95	\$28,716,000
	Industrial			0	\$0
	Municipal, Public, Non-profit			2	\$1,034,400
4	Residential	826	1519	367	\$262,753,400
	Commercial			142	\$61,110,300
	Industrial			0	\$0
	Municipal, Public, Non-profit			7	\$11,276,300

Using GIS, we are able to count the vulnerable people and property, in this case by hurricane category.

**Edgartown Hurricane Inundation Vulnerability (SLOSH)**  
**Based on preliminary data Released by the USACOE New England District in March 2013**  
**Potential Development**

SLOSH cat.	Use	# People (other)	# People (July-Aug)	# Buildings	Approx. Value
		2.25 per building	4.14 per building		
1	Residential	682	1254	303	\$237,186,957
	Commercial			26	\$39,104,000
	Industrial			0	\$0
	Municipal, Public, Non-profit			14	\$2,576,700
2	Residential	286	526	127	\$94,190,222
	Commercial			0	\$0
	Industrial			0	\$0
	Municipal, Public, Non-profit			4	\$3,058,800
3	Residential	200	368	89	\$66,289,634
	Commercial			0	\$0
	Industrial			0	\$0
	Municipal, Public, Non-profit			6	\$3,103,200
4	Residential	263	484	117	\$83,766,070
	Commercial			0	\$0
	Industrial			0	\$0
	Municipal, Public, Non-profit			15	\$24,163,500

We also use GIS to estimate the impacts of future development. This is a handy tool for planning.

## VULNERABILITY ASSESSMENTS

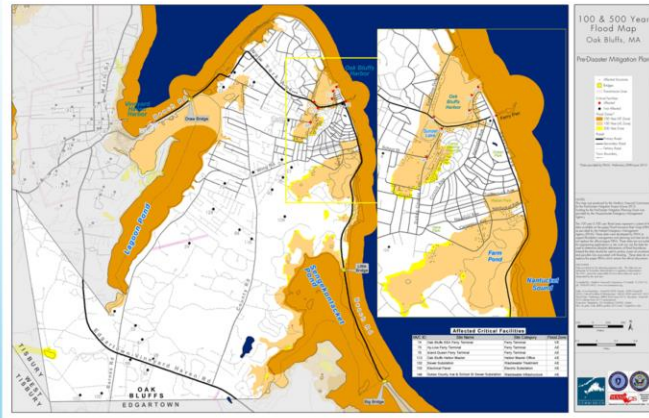
### HURRICANE STORM SURGE

#### Climate Change Impacts

- Rare occurrence here; “probability” the same or less
- SLR will expand vulnerability landward

There is no real probability for us being the landfall target of a hurricane. Climate change will not affect that. There may be fewer North Atlantic hurricanes. What we don't have a grip on is the potential vulnerability after SLR.

## VULNERABILITY ASSESSMENTS



### FIRM MAPS - Nor'Easter Type of Storm "Bathtub" Map, not a Model

We add information about development from our own database, showing vulnerable buildings and critical facilities. We are fortunate to have recently improved topographic data from LIDAR, incorporated into the update.

## VULNERABILITY ASSESSMENTS

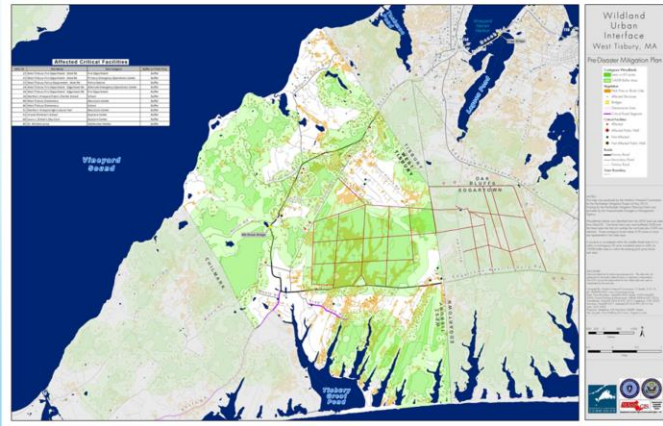
### Nor'Easter – type Storm Climate Change Impacts

- More severe winter storms
- Higher winter temperature
- More winter rainfall
- What about vulnerability after SLR?

Yes, we do expect more winter storms, more in number and more severe. We're already seeing that. The FIRM maps are from a "bathtub" scenario. There is no model involved like the SLOSH maps.



## VULNERABILITY ASSESSMENTS



### DROUGHT AND WILDFIRE Wildland – Urban Interface

We mapped fuels as well as proximity to woodland > 50 acres. In 1957, a wildfire burned 18,000 acres from Carver to Plymouth, all the way to the water. In the first 6 hours, 12,500 acres burned at the rate of 53 acres/minute.

## VULNERABILITY ASSESSMENTS

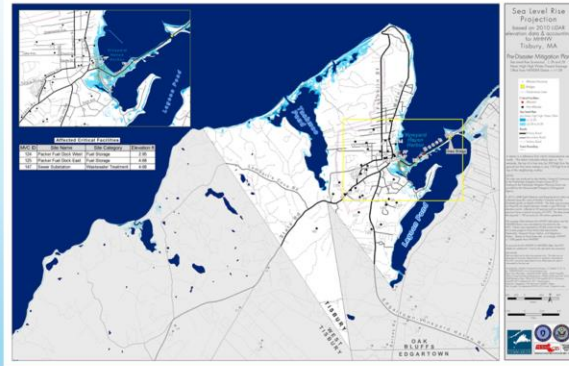
### DROUGHT AND WILDFIRE

#### Climate Change Impacts

- Roughly the same amount of summer rain, but dispersed differently
- Periods of short-term drought, punctuated by heavy rainstorms
- Not very different summer temperature

Short-term drought punctuated by heavy rainstorms. Used to be we could keep riding a bike home through a summer rain. Not any more.

## VULNERABILITY ASSESSMENTS



**SEA LEVEL RISE**  
1.5' by 2050, 5' by 2100

Vulnerability is not critical in terms of loss of life, but really significant for infrastructure. We made these inundation maps for each town.

## VULNERABILITY ASSESSMENTS



**SEA LEVEL RISE**  
1.5' by 2050, 5' by 2100

This part of Vineyard Haven typically floods over the road, both at 5 Corners and along Beach Road.

## VULNERABILITY ASSESSMENTS



Five Corners, Vineyard Haven

## SEA LEVEL RISE Visualizations

We used a NOAA program called CanVis to illustrate impacts at several sites. This assessment is very evocative, to say the least, and a good complement to the maps of lateral extent.

## VULNERABILITY ASSESSMENTS



## SEA LEVEL RISE Visualizations

## VULNERABILITY ASSESSMENTS



## SEA LEVEL RISE Visualizations

## VULNERABILITY ASSESSMENTS



**SEA LEVEL RISE**  
1.5' by 2050, 5' by 2100



## VULNERABILITY ASSESSMENTS



Beach Road, Vineyard Haven

## SEA LEVEL RISE Visualizations

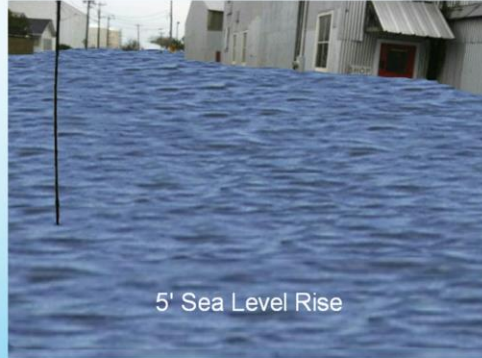
This is a boatyard that straddles Beach Road. It is a water-dependent use integral to the commercial waterfront.

## VULNERABILITY ASSESSMENTS



## SEA LEVEL RISE Visualizations

## VULNERABILITY ASSESSMENTS



## SEA LEVEL RISE Visualizations

## VULNERABILITY ASSESSMENTS

### WETLANDS



Competing with Other Uses  
as Sea Level Rises

There are many impacts of climate change that impact wetlands, but SLR is one that we can plan for. Note the For Sale sign.

## VULNERABILITY ASSESSMENTS

### WETLANDS



**Competing with Other Uses  
as Sea Level Rises**

Where will the marsh migrate as sea level rises.

## VULNERABILITY ASSESSMENTS WETLANDS



Competing with Other Uses  
as Sea Level Rises



## VULNERABILITY ASSESSMENTS Wetlands Elevation Monitoring



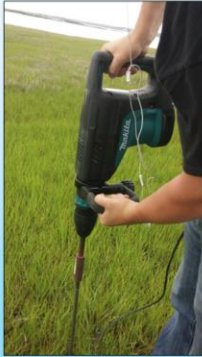
Mass Audubon Hosted the First Rod-SET Site

Notice the women taking the lead. This is the first Rod-SET site on Martha's Vineyard.



## VULNERABILITY ASSESSMENTS

### Wetlands Elevation Monitoring



Rods are driven into  
The marsh to stabilize  
the receiver

WBNERR loaned us  
this power driver.

## VULNERABILITY ASSESSMENTS Wetlands Elevation Monitoring



Friends of Sengekontacket Funded  
The Materials and Installation

We wouldn't get much done without the pond advocacy groups.

## VULNERABILITY ASSESSMENTS Wetlands Elevation Monitoring



Rod-SET Survey Armature Measures Elevation  
Edey Foundation Purchased the Armature

Edey Foundation is an Island-wide non-profit. They sponsored the purchase of the armature for use at this and future installations.

## MITIGATION STRATEGIES

### FLOOD

Size Stormwater Facilities for  
25-year Rainstorm Rather than  
10-year

Band-Aid Until Calculations  
Catch Up

Baby Step?

Maybe, but Consensus Achieved

We know that the 10-year calculation is outdated. The 25-year rainfall is a real number for the engineers to use. Achieving consensus is big.

MITIGATION STRATEGIES

WILDFIRE

Regulate Subdivisions so that Cedar Shingles May Not be Required in the Covenants

Require Dry Hydrants to Pump From Nearby Sources

These are significant for the type of development that is made in the wildland-urban interface.

## MITIGATION STRATEGIES WILDFIRE



## Controlled Burns in Grasslands

Suppression of fire has created hazardous conditions.

## MITIGATION STRATEGIES

### SEA LEVEL RISE

Outreach with at Least  
One Example of What We're  
Doing for Adaptation

The Truth is Scary.  
Fear makes for bad decisions.

Outreach is tricky. We don't want deer-in-the headlights response.

## MITIGATION STRATEGIES

### SEA LEVEL RISE

SLOSH Maps and FIRM Maps Do Not Account for SLR

Hybrid Mapping to Insinuate Sea Level Rise into Assessments

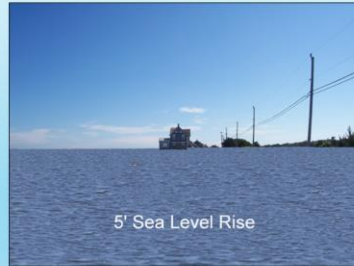
Vulnerability assessments should assess what's wet after SLR.



## MITIGATION STRATEGIES

### SEA LEVEL RISE

Try to Stimulate Interest in the  
Long View Beyond 5 Years



**Make Short-term Effort Selective**

Look at the long-term prognosis.

## MITIGATION STRATEGIES

### SEA LEVEL RISE



**This is the Worst Strategy**

The only way to really go wrong is to do nothing.

## MITIGATION STRATEGIES

### SEA LEVEL RISE

#### Slide Show

Visualizing Sea Level Rise  
Around Martha's Vineyard  
available on Youtube

[https://www.youtube.com/watch?v=hFHzgQzd4\\_c&feature=youtu.be](https://www.youtube.com/watch?v=hFHzgQzd4_c&feature=youtu.be)