Towns of Wellfleet & Truro Community Resilience Building Workshop Summary of Findings

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

CAPE COD COMMISSION

CAPE COD COOPERATIVE EXTENSION

ACKNOWLEDGEMENTS

Special thanks to the Towns of Wellfleet and Truro for participating in the MVP program and for joining one another to address climate change resiliency and adaptation issues together through a regional approach. Thank you to workshop participants from Wellfleet and Truro for your time, insights, important contributions, and for working together to support your individual communities and the Outer Cape as a region.

Funding to support the Wellfleet and Truro Vulnerability Preparedness (MVP) Workshop was provided by the Massachusetts Executive Office of Energy and Environmental Affairs through an MVP Planning Grant and issued to the Towns of Wellfleet and Truro during the fiscal year of July 2018 through June 2019. The Towns of Wellfleet and Truro contracted with the Cape Cod Commission to provide MVP certified staff to support the Towns in planning and facilitating the workshop.

SUGGESTED CITATION

Towns of Wellfleet and Truro. 2019. Wellfleet and Truro Municipal Vulnerability Preparedness Workshop Summary of Findings. Prepared by the Cape Cod Commission, Barnstable, MA.

Table of Contents

Introduction and Overview

The need for municipalities, regional planning organizations, states, and federal agencies to increase resilience and adapt to extreme weather events and climate change is evident, particularly in coastal communities. Cape Cod has already begun to experience effects of climate change and associated natural hazards, including sea level rise and extreme weather events. The strong nor'easters of 2018 unleashed a new sense of urgency to act. Massachusetts Governor Baker's Executive Order 569 aims to provide communities with technical support, climate change data, and planning tools to identify natural hazards and develop strategies to improve resilience. Following the executive order, the state created the Massachusetts Municipal Vulnerability Preparedness (MVP) program, a state program designed to increase municipality-level resilience to natural hazards being exacerbated by climate change. Through the MVP process, municipalities identify their vulnerabilities and strengths and identify opportunities to reduce risk and build resilience. Communities that complete an 8-hour MVP workshop using the Community Resilience Building (CRB) Framework, a system of facilitated discussion and note taking that the Nature Conservancy developed, become eligible to receive funding for resilience projects.

The towns of Wellfleet and Truro received a joint grant from the state to participate in the MVP program as a regional partnership. The towns sought to build on their 2017 Hazard Mitigation Plans and prior resiliency planning efforts and develop a list of priority actions to focus on in the immediate future. The towns contracted with the Cape Cod Commission, a certified MVP provider, who partnered with Cape Cod Cooperative Extension/Woods Hole Sea Grant staff, to guide them through the MVP program process and conduct a CRB workshop.

This report provides a summary of the concerns, ideas, and priorities shared by participants during the Wellfleet/Truro

MVP workshop. The summary of findings described in this report, including those that concern the evolving nature of risk assessment and associated action, are compiled from workshop materials and comments, including corrections, and updates from workshop participants and Core Team members.

WORKSHOP PLANNING AND CORE/PROJECT TEAMS

The Wellfleet Health and Conservation Agent and the Truro Health and Conservation Agent served as the Towns' leads for the project. The towns assembled a group of town staff members and a National Park Service official to serve as the MVP Workshop "Core Team" to help prepare for and conduct the workshop. The Core Team included the following:

- Hillary Greenberg- Lemos, Wellfleet Health and Conservation Agent (Project Lead)
- Emily Beebe, Truro Health and Conservation Agent (Project Lead)
- Justin Post, Wellfleet Building Commissioner
- Steve Parker, Truro Town Planner
- Arozana Davis, Truro Assistant Health/Conservation Agent
- Douglas Guey-Lee, Wellfleet Assistant Health/Conservation Agent
- Nancy Civetta, Wellfleet Shellfish Constable
- Lauren McKean, Cape Cod National Seashore Planner

The "Project Team" was comprised of Cape Cod Commission (CCC) staff and Cape Cod Cooperative Extension/Woods Hole Sea Grant and included the following:

- Martha Hevenor, CCC Planner II
- Sharon Rooney, CCC Chief Planner
- Chloe Schaefer, CCC Community Design Planner
- Heather McElroy, CCC Natural Resources Manager
- Anne Reynolds, CCC GIS Director
- Erin Perry, CCC Deputy Director
- Shannon Hulst Jarbeau, Cape Cod Cooperative Extension & Woods Hole Sea Grant – Floodplain Specialist and CFM Coordinator
- Greg Berman, Woods Hole Sea Grant & Cape Cod Cooperative Extension - Coastal Processes Specialist

The Core Team and the Project Team held a kickoff meeting in January 2019 to review the project scope and discuss ways to encourage stakeholder participation at the workshop. The group also discussed workshop materials and tasks.

The Project Team was responsible for developing the workshop agenda and slide presentation, resource maps and reference materials for use in workshop discussion; workshop logistics, and facilitating and scribing group discussions. The Core Team's responsibilities included identifying a diversity of representative stakeholders to invite to the workshop; contacting invitees to encourage attendance; and participating in the workshop as discussion scribes and stakeholders.

After the kickoff meeting, the Towns' Project Leads determined that the workshop should be held as a single eight-hour day shared by the two Towns, rather than split into two four-hour sessions with one in each Town. They developed a meeting invitation and sent it to stakeholders on town boards and committees, elected officials, Conservation Trust members, Cape Cod National Seashore and Town staff including Harbormaster, Beach and Recreation, shellfish department, and others. The Town of Truro created a website and linked it to the invitation; the website included information about the grant and the MVP process. It provided an invitation for the public to attend, as well as a place from which to register. The website also displayed links to the Truro and Wellfleet Hazard Mitigation Plans and offered visitors a survey about climate change.

WORKSHOP ATTENDEES

The workshop was held on March 12 from 8 to 4 at Wellfleet's Preservation Hall located at 335 Main Street.

42 people, about half representing each town, attended the workshop. Stakeholders represented a range of interests including Cape Cod National Seashore; each Town Select Board; Conservation Commissions; Boards of Health; Energy Committees; Police and Fire Departments; Truro Zoning Board of Appeals; Truro Planning Board; Truro Finance Committee; Truro Historical Commission; Wellfleet Conservation Trust; Wellfleet Public Works; Wellfleet Water Commissioners; Wellfleet Shellfish Department; Wellfleet Building Department; Wellfleet Recycling Committee; Friends of the Herring River; Truro and Wellfleet Town Administration; and year-round Truro and Wellfleet residents.

THE WORKSHOP PROCESS

The Town Project Leaders opened the workshop with a brief introduction and explained the rationale for conducting a joint workshop, noting the shared resources between the two communities, their history of working together, and how a regional approach is needed to address climate change and coastal resiliency. The Project Team then gave a slide presentation with an overview of the day's agenda and purpose of the workshop, MVP program background and the CRB process. Woods Hole Sea Grant/Cape Cod Cooperative Extension staff presented a summary of the state's 2018 climate projections; sea level rise data; bayside sediment transport; recent storm impacts, and a review of priority natural hazards from the 2017 Hazard Mitigation Plans. Local examples of storm damage such as the impacts to Truro's Ballston Beach and Long nook Beach from the winter storms of 2018, and the torrential rain event in summer 2018 that washed a car down an eroded

bank at Wellfleet's Cahoon Hollow Beach were presented, as well as a comparison to historic storm events. The presenters explained that the January 2018 storm water-level broke the record 1978 storm water level only due to rising sea levels. Transect data from the latest FEMA Flood Insurance study showed that the difference between the water level of a 10% annual chance storm and 1% annual chance storm is only 1.3' in some areas. This value was compared to sea level rise projections (provided by the state) to show that such sea level increase is predicted to occur relatively soon.

The presentation also described coastal erosion in the context of a sediment budget described by research by the Center for Coastal Studies (2013), which indicated areas of diverging sediment transport and likely erosional areas. The presentation included a suite of climate variables downscaled to the Barnstable County watershed, and introduced the "Resilient MA" website's interactive map for viewing sea level rise, storm surge, etc. Specific climate change projections shared with the group include: temperature, days over 95 degrees, sea level rise, and the increase in heavy precipitation events (combined with the 12% increase in the 100-year storm from 2008 to 2017). Sea level rise projections were integrated with the CCC's online SLR Viewer to show inundation extents in Wellfleet Harbor at various scenarios and timeframes. (See Appendix for presentation slides.)

Following a brief discussion about climate data and modelling, the project team instructed the participants on the first small-group exercise for the day.

Participants sat at one of four discussion group tables: one all-Truro table ("A); two all-Wellfleet ("C" and "D"); and one "mixed" table with Wellfleet, Truro and the NPS ("B) - for the duration of the workshop. Each table had a facilitator (Project Team member) and a scribe (either Project Team member or Core Team Lead). A base map of each community with critical town information and infrastructure was provided at each table. The maps included roads; critical facilities identified in the towns' 2017 hazard plans; FEMA flood zones, 3-foot sea level rise delineation; and historic shoreline delineation. Each table also had a laptop computer loaded with a data viewer developed by the Cape Cod Commission that provides climate and demographic data. An easel with a blank poster size "Risk Matrix" for the group to fill out was at each table.

Each table developed its own risk matrix through facilitated "small team" exercises and later worked together as a large team with all stakeholders to consolidate information (See Appendix for completed risk matrices.) The combination of the Risk Matrix and the base map provided decision-support and risk visualization to enable stakeholders to identify the community's strengths and vulnerabilities and prioritize actions to reinforce strengths or mitigate vulnerabilities. The process resulted in informed input, shared experiences, and dialogue among stakeholders.

TOP HAZARDS

Using the base maps as a guide, each small team engaged in a facilitated discussion to identify what they consider to be the top four hazards that pose the greatest current and future threats to Wellfleet and Truro. A slide showing the top hazards the communities selected in their Hazard Mitigation Plan was projected on the screen for reference. To help each group determine priority hazards, facilitators asked participants to consider where, how often, and in what ways hazards have impacted the community; what hazards are impacting the community currently; what effects these hazards might have in the future; what is exposed to hazards and climate threats; what have been the impacts to municipal operations and budgets, potential planning and mitigation efforts; and other concerns/considerations related to impacts.

STRENGTHS AND VULNERABILITIES

Following the hazards discussion, the groups identified infrastructural, societal, and environmental features that represent either a vulnerability or a strength to the community in the face of anticipated climate change hazards. Participants marked these features on the base maps and the scribe listed them on the risk matrix. In addition to the features, participants were asked to indicate their location, ownership, and whether they are a strength or vulnerability (or both) for the town. The exercise concluded with each group reporting out its priority hazards and the vulnerable features and strengths.

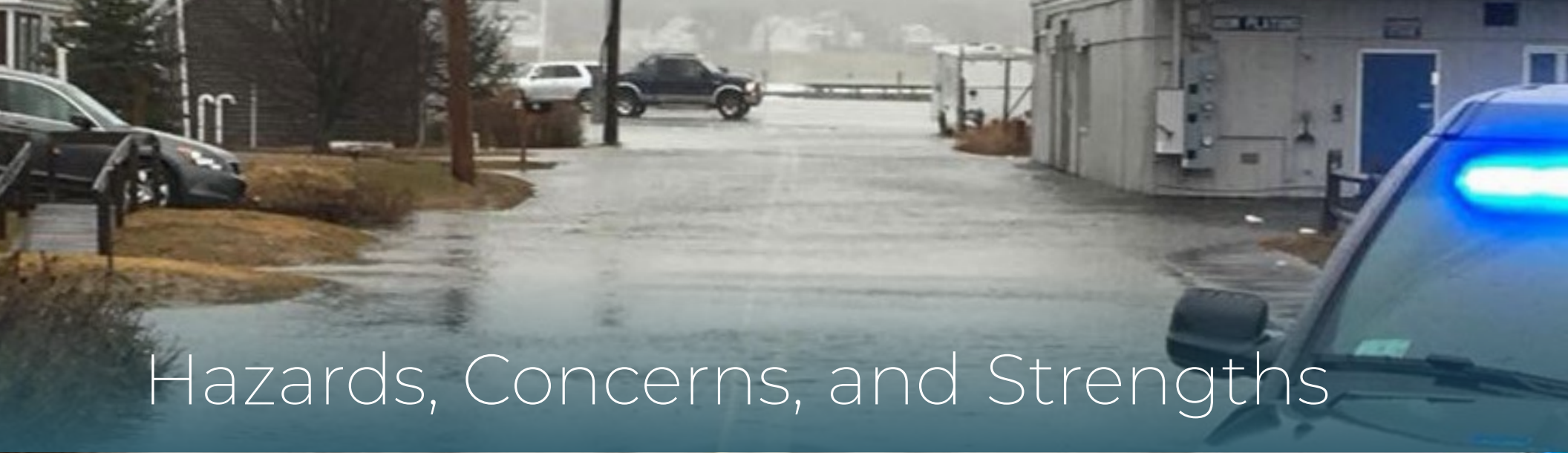
ACTIONS

After a lunch provided by the Town of Wellfleet the workshop attendees continued their work on the second small-group exercise to develop a list of actions to address/mitigate the vulnerabilities and support/enhance the strengths. Action items were framed as either: strategies to protect vulnerable features in the community from negative impacts or ways to better use a community strength. In addition to developing the actions, the groups were tasked with identifying a timeframe for their implementation (short, long, ongoing) and priority (high, medium, low). The final task for the small group exercise was to choose three highest priority actions and report out to the large group.

As groups reported their top priority actions, a Project Team scribe wrote them on a poster size flip chart and posted each table's top actions on the wall for the room to see. Following the presentation of each group's priorities, stakeholders together with the workshop facilitator combined duplicative suggestions to create a final list of priority actions that the towns should embark upon to increase the resilience of the community in the face of anticipated climate change impacts.

WORKSHOP RESULTS – STAKEHOLDER INPUT

The results of each stage of the workshop discussions are presented in the subsequent sections of this report. In addition, the Appendix shows the Risk Matrices produced by each of the four discussion groups. The Appendix also includes the base maps with notations from each table and a matrix compilation of all the identified actions from the four discussion groups. The top priorities from each small group discussion are indicated with bold font. A copy of the May 2019 listening session sign-in sheet can also be found in the Appendix.



Hazards, Concerns, and Strengths

TOP HAZARDS

The small teams discussed whether top hazards should be identified as: those with the most impact, such as a hurricane; those that occur more frequently such as flooding or high winds; or hazards that the town was least prepared for or would impact the town's budget and/or impact the most people. Stakeholders also felt that there was overlap among the top hazards, such as high winds and hurricanes, or nor'easters and winter weather. Coastal erosion, flooding, sea level rise, and severe/extreme weather and storms were identified as the top hazards.

The following list represents all the top hazards reported by the four discussion groups:

- Flooding
- Sea level rise
- Coastal erosion
- Extreme/severe weather
- High winds/hurricane
- Ocean acidification
- Climate change

CURRENT CONCERNS AND CHALLENGES PRESENTED BY HAZARDS

Addressing climate change impacts is an urgent matter for these neighboring Outer Cape communities, whose economies depend heavily on coastal tourism, shellfish aquaculture (Wellfleet, in particular), fin-fishing, and the continued availability of these resources and access to them. The towns are vulnerable to flooding, storm surges, coastal erosion, and sea level rise that threatens the built environment, drinking water aquifer, biodiversity, and natural resources. In recent years, the towns have experienced

major coastal storm erosion from increased wind and wave action; witnessed higher storm surges and overtopping of local roads, experienced flooding from heavier rain events, salt water intrusion damage to several drinking water wells, and power outages during extended summer heat waves and winter storms.

COASTAL EROSION

Erosion is a top concern in both communities. Storms in recent years have caused increased erosion on both bayside and Atlantic beaches, resulting in damage to homes, beach parking lots, and roads. Coastal tourism is a key economic asset to both communities, with the Outer Cape beaches a primary attraction. As beach parking lots erode, and access and parking spaces are lost, the towns will need to develop policies and plans to address the issue. Beach parking is a significant source of revenue. Private building (construction and re-development) continues to occur in flood prone areas and in fragile/vulnerable areas, with local boards unable to protect these resources under the existing regulatory framework.

AQUACULTURE, SHELLFISH BEDS AND RESOURCES

Wellfleet's shellfishing industry is a key economic assets. Aquaculture farms, shellfish beds and water resources are vulnerable to contamination from subsurface sewage disposal systems and ground water rise, stormwater run-off from extreme storms, ocean acidification, and warmer water temperatures. Warmer waters increase predation, support species shifts, and increase problems with infectious diseases such as the Vibrio bacteria.

LOW-LYING ROADS AND CULVERTS

Recent winter storms, nor'easters, and extreme rain events have flooded town roads in Wellfleet and Truro impacting access and private and public properties. East Commercial Street in downtown Wellfleet, Kendrick Avenue, and Indian Neck were flooded during strong storms in 2018; Mill Pond Road and Truro Center Road over-washed in 2 storm events. Route 6 serves as the primary travel corridor on the Outer Cape with no secondary route/ road alternatives in some locations. Several undersized and damaged culverts have contributed to flooding events.

DRINKING WATER

Most of Wellfleet and Truro rely on private wells for drinking water. Salt and fresh water inundation from storm surge has damaged private drinking water wells in Truro and Wellfleet by over-wash. Continued storm surges and well damage could cause residents to lose their drinking water supply. In addition, homes dependent on private wells have no water during power outages. The communities may need to consider expansion of the public water supply and infrastructure, or improved access to alternative power sources.

Seasonality: Both Wellfleet and Truro experience an exponential increase in population (from 2700 and 2175 respectively to an estimated 15,000-20,000) in the summer months. The increase in summer residents increases the level of need for emergency response, public education, and population management during storm events. Additionally, many of the features that attract the summer populations are vulnerable to the identified hazards, posing a challenge between natural resources, hazard management, and the economic value of summer populations, beaches, and seasonal housing in vulnerable locations. In addition, the seasonality of the population creates challenges for public officials in their efforts to educate and inform the community about hazard and climate change impacts and resiliency planning. A significant percentage of the population is out of town half of the year and is not as well informed on current conditions and increasing impacts from climate change.

Age of population: The average age of Wellfleet and Truro residents is 58 years. The population continues to age and have adjusted needs, such as medical attention, access to medication, mobility challenges, and others. During a storm event, special attention needs to be paid to these needs of the aging population.

LAND PROTECTION

Development in sensitive areas like floodplains has contributed to a significant amount of the towns' vulnerability. Structures have been damaged and some have been demolished and rebuilt in these areas. Continued development in these areas may not be viable long-term.

NEIGHBORHOODS

The Beach Point area of Truro and Wellfleet's Mayo beach area present special challenges because they are at particular risk to flooding. Beach Point is a densely populated stretch of developed beach-front which is a barrier beach, and completely within the FEMA mapped flood plain. Beach Point extends 2.5 miles from the Knowles Crossing public water supply well (which supplies Provincetown with municipal water) to the Provincetown line. Beach Point includes single family homes, motels and condominium complexes.

Wellfleet's Mayo Beach area is also a barrier beach, also entirely in the flood plain, and it abuts the Wellfleet Town pier and Wellfleet Harbor. It is home to a densely developed neighborhood and includes single family residences, the Harborside Village mobile home park, Cottage Colonies, condominiums and a 200 + seat restaurant.

ELECTRICAL SUPPLY

There have been several prolonged power outages in Wellfleet and Truro during times of high winds, storm events, and extreme heat. Private wells rely on power to run.

CURRENT STRENGTHS AND ASSETS

The discussion groups/tables identified numerous of strengths and assets within the communities for improving local and regional resilience to climate change impacts. Some of the strengths were also considered to be weaknesses or have aspects that are vulnerable as well. These include:

INFRASTRUCTURAL FEATURES

- Wellfleet Harbor and Marina (also vulnerability – also societal and environmental strength)
- Provincetown regional shelter/ Barnstable County Sheltering Plan
- Helicopter pad at Marconi
- Phone/call boxes at beaches (coming soon Summer 2019)
- Mayo Beach
- Beach Point
- Drinking water- public water supply and private wells
- Shellfish infrastructure

SOCIETAL FEATURES

- Inter-governmental cooperation, government agencies: CCNS, CCC
- NGOs: Center for Coastal Studies, Friends of Herring River, Friends of CCNS, IFAW, Audubon, and Conservation Trusts, etc.
- Highland Center
- Public safety
- Farming/Agriculture
- Finfishing
- First responders
- EMT training
- Councils on Aging
- AmeriCorps
- Church shelters and elementary school shelter
- Shellfishing and aquaculture
- Community volunteers – many of whom have expertise and energy
- Neighborhood associations
- Sense of community on the Outer Cape and local population
- Outer Cape pharmacy
- Shellfish infrastructure
- Regional shelter system
- Local businesses
- Public safety network/police contacts for vulnerable population

ENVIRONMENTAL FEATURES

- Wetlands and marshes
- Beaches, dunes, and coastal banks,
- Barrier beaches – Mayo Beach and Beach Point
- Herring River restoration project
- Mayo Creek restoration
- Conservation regulations and bylaws
- Wellfleet “Gut”
- Pamet River and Ballston Beach
- Longnook Beach
- Shellfish and finfish resources
- Cape Cod National Seashore
- Boards of Health and Conservation Commissions

Recommendations and Next Steps

TOP RECOMMENDATIONS TO IMPROVE RESILIENCE

Following the presentation of each group's priorities, workshop participants, along with the workshop facilitator, combined duplicative suggestions to create a final list of suggestions. The top five action items were chosen as highest priority and are listed below:

- Pursue funding for culvert replacement and salt marsh restoration.
- Identify low-lying roads and beach parking lots susceptible to erosion and develop and implement a plan to address road flooding problems and beach access issues.
- Expand and improve communication system, electrical and infrastructure network through improved access throughout the communities.
- Develop an Outer Cape grassroots education and outreach strategy to address climate resilience.
- Pursue bylaw and regulatory changes to address resilience.
- Development plan for nutrient reduction.

CONCLUSION AND NEXT STEPS

Wellfleet and Truro will continue the MVP certification process by presenting and distributing this report to the public at a formal public information and listening session, scheduled for May 29, 2019 at the Truro Public Library. This session will provide an opportunity for stakeholders to review the draft report and for any member of the interested public to learn, ask questions, and provide feedback about the March 12, 2019 MVP Workshop and the recommended highest priority actions that emerged from that workshop.

LISTENING SESSION SUMMARY

About 15 people attended the May 29, 2019 MVP listening session. Projects Leads Emily Beebe, Truro Health and Conservation Agent and Hillary Greenberg-Lemos, Wellfleet Health and Conservation Agent, presented an overview of the MVP process and the draft Summary of Findings. In addition to questions about MVP funding opportunities and future projects, some attendees raised concerns about mitigation vs. adaptation and that the focus of the workshop and the MVP program was more about the latter. One attendee thought that fire should be identified as a hazard.

Project Team & Workshop Participants

CRB WORKSHOP PROJECT TEAM

MVP PROVIDER – CAPE COD COMMISSION

- Martha Hevenor, CCC Planner II
- Sharon Rooney, CCC Chief Planner
- Chloe Schaefer, CCC Community Design Planner
- Heather McElroy, CCC Natural Resources Manager
- Anne Reynolds, CCC GIS Director
- Erin Perry, CCC Deputy Director

MVP PROVIDER – WOODS HOLE SEA GRANT/CAPE COD COOPERATIVE EXTENSION

Woods Hole Sea Grant/Cape Cod Cooperative Extension staff included the following:

- Greg Berman - Coastal Processes Specialist
- Shannon Jarbeau - Floodplain Specialist & CRS Coordinator

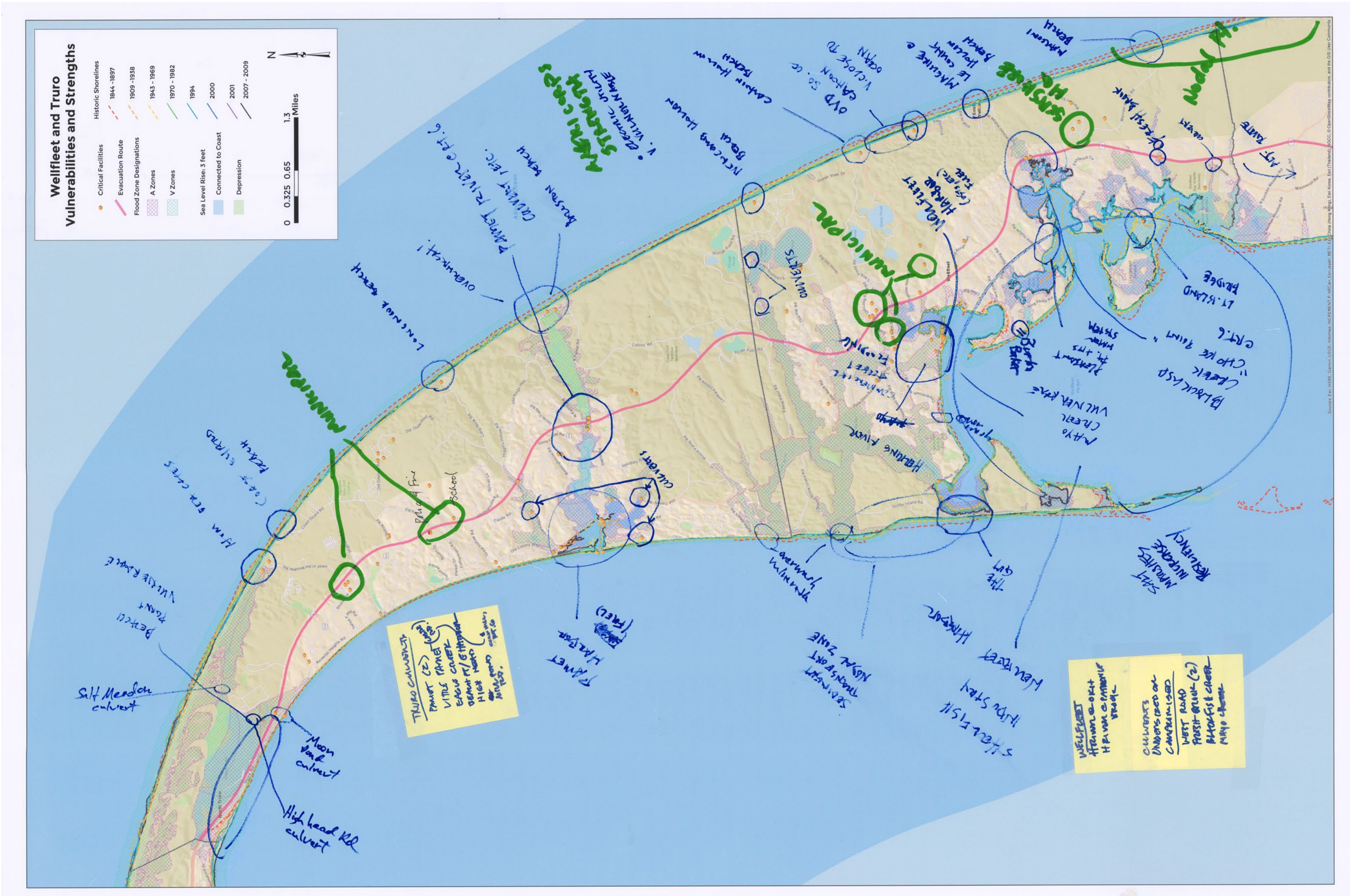
PROJECT SPONSORS

- Wellfleet Conservation Commission
- Truro Conservation Commission

LIST OF PARTICIPANTS

- Denny O'Connell, Wellfleet Conservation Trust
- John Portnoy, Conservation Commission, Wellfleet
- Jarrod Cabral,Truro DPW
- Jordan Fleming, Americorps Cape Cod
- Emily Beebe, Truro Health & Conservation
- Carol Magenen, Energy Committee
- Michael Fisher, Conservation Commission & Conservation Trust, Wellfleet
- Bob Weinstein, Truro Selectboard
- Susan Areson, Truro ZBA and Finance
- Rachel St. Germain, Americorps-Vista-HOW
- Arozana Davis, Town of Truro
- Lauren Kaufmann, Truro Historical Society
- Dave Koonce, Wellfleet Conservation Trust
- Jim Hood, Wellfleet Water Commissioners
- Hillary Greenberg, Wellfleet Health & Conservation
- Nancy Civetta, Wellfleet Shellfish Constable
- Bruce Bolyn, Truro Planning Board
- Lauren McKean, Cape Cod National Seashore
- Jean Leidenfrost, Wellfleet DPW
- Chris Clark, Local Comprehensive Plan Comm., Truro
- Daniel Holt, Truro
- Joan Holt, Truro
- Dick Elkin, Wellfleet Energy Committee
- Joe Powers, Town of Wellfleet/Asst TA
- John Cumbler, Wellfleet
- Janet Drohan, Wellfleet Board of Health
- Evelyn Jackson, Wellfleet
- Becky Rosenberg, Wellfleet Recreation Dept
- Tim Collins, Truro Fire Chief
- Maureen Burgess, Truro Selectboard
- Kristin Reed, Truro Selectboard
- Suzanne Grout Thomas, Town of Wellfleet
- Lydia Vivante, Wellfleet
- Gary Joseph, Friends of Herring River
- Jude Ahearn, Wellfleet
- Kathleen Bacon, Wellfleet Selectboard
- Ron Fisette, Wellfleet Police Chief
- Justin Post, Town of Wellfleet Building Inspector
- Adrienne Tardif, Americorps - Truro & Wellfleet Health & Conservation
- Barbara Brennessel, Wellfleet Conservation Commission & Friends of Herring River

Appendix



GROUP A BASEMAP

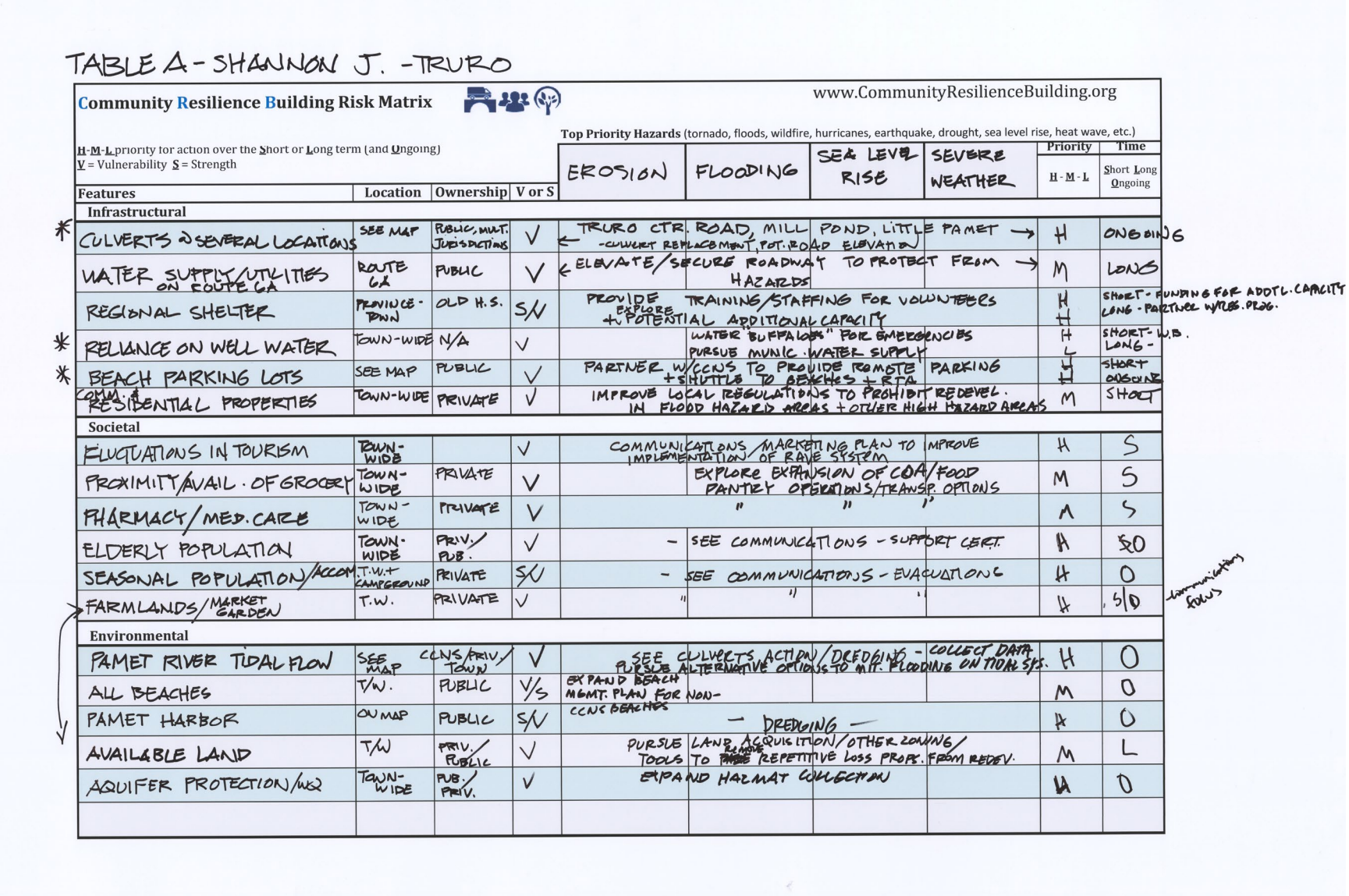


TABLE A - SHANNON J. - TRURO

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

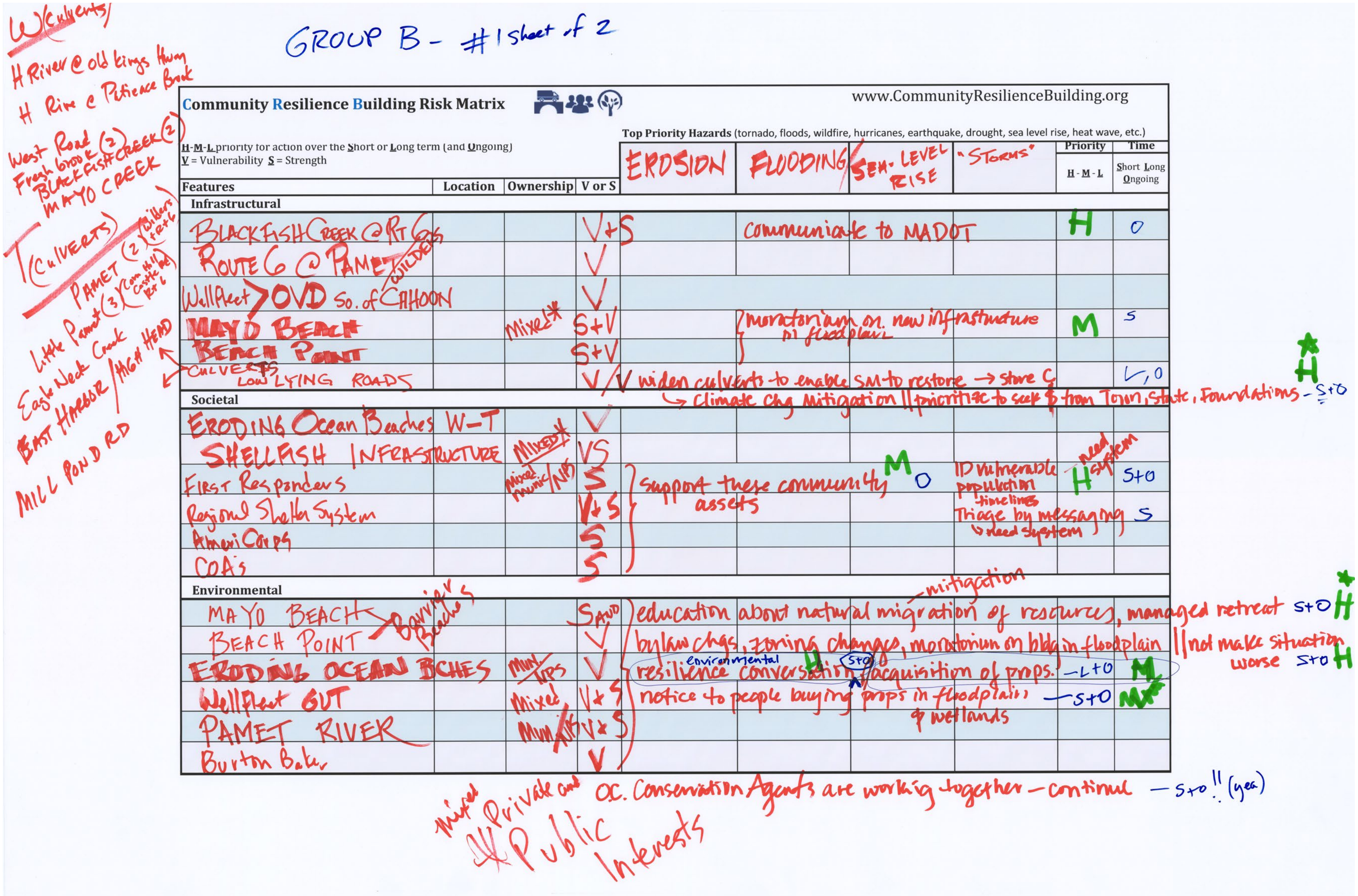
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	EROSION	FLOODING	SEA LEVEL RISE	SEVERE WEATHER	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
* CULVERTS @ SEVERAL LOCATIONS	SEE MAP	PUBLIC, MULT. JURISDICTIONS	V	← TRURO CTR. ROAD, MILL POND, LITTLE PAMET → -CULVERT REPLACEMENT, POT. ROAD ELEVATION				H	ONGOING
WATER SUPPLY/UTILITIES ON ROUTE 6A	ROUTE 6A	PUBLIC	V	← ELEVATE/SECURE ROADWAY TO PROTECT FROM HAZARDS →				M	LONG
REGIONAL SHELTER	PROVINCE-TWN	OLD H.S.	S/V	PROVIDE TRAINING/STAFFING FOR VOLUNTEERS EXPLORE +POTENTIAL ADDITIONAL CAPACITY				H H	SHORT - FUNDING FOR ADDTL. CAPACITY LONG - PARTNER WITH REG. PROG.
* RELIANCE ON WELL WATER	TOWN-WIDE	N/A	V		WATER BUFFALOES" FOR EMERGENCIES PURSUE MUNIC. WATER SUPPLY			H L	SHORT - W.B. LONG -
* BEACH PARKING LOTS	SEE MAP	PUBLIC	V	PARTNER W/CCNS TO PROVIDE REMOTE +SHUTTLE TO BEACHES + RTA			PARKING	H L	SHORT ONGOING
COMM. & RESIDENTIAL PROPERTIES	TOWN-WIDE	PRIVATE	V	IMPROVE LOCAL REGULATIONS TO PROHIBIT REDEVEL. IN FLOOD HAZARD AREAS + OTHER HIGH HAZARD AREAS				M	SHORT
Societal									
FLUCTUATIONS IN TOURISM	TOWN-WIDE		V	COMMUNICATIONS/MARKETING PLAN TO IMPROVE IMPLEMENTATION OF RAVE SYSTEM				H	S
PROXIMITY/AVAIL. OF GROCERY	TOWN-WIDE	PRIVATE	V		EXPLORE EXPANSION OF COA/FOOD PANTRY OPERATIONS/TRANSP. OPTIONS			M	S
PHARMACY/MED. CARE	TOWN-WIDE	PRIVATE	V		"	"	"	M	S
ELDERLY POPULATION	TOWN-WIDE	PRIV./PUB.	V	-	SEE COMMUNICATIONS - SUPPORT CERT.			H	S/O
SEASONAL POPULATION/ACCOM.	T.W.+ CAMPGROUND	PRIVATE	S/V	-	SEE COMMUNICATIONS - EVACUATIONS			H	O
FARMLANDS/MARKET GARDEN	T.W.	PRIVATE	V	"	"	"	"	H	S/O
Environmental									
PAMET RIVER TIDAL FLOW	SEE MAP	CCNS/PRIV./TOWN	V	SEE CULVERTS ACTION/DREDGING - PURSUE ALTERNATIVE OPTIONS TO MIT. FLOODING ON TIDAL SYS.			COLLECT DATA	H	O
ALL BEACHES	T/W.	PUBLIC	V/S	EXPAND BEACH MGMT. PLAN FOR NON-CCNS BEACHES				M	O
PAMET HARBOR	ON MAP	PUBLIC	S/V	— DREDGING —				H	O
AVAILABLE LAND	T/W	PRIV./PUBLIC	V	PURSUE TOOLS TO REMOVE REPETITIVE LOSS PROPS. FROM REDEV.	LAND ACQUISITION/OTHER ZONING/			M	L
AQUIFER PROTECTION/WQ	TOWN-WIDE	PUB./PRIV.	V	EXPAND HAZMAT COLLECTION				H	O

communications focus

GROUP A RISK MATRIX

GROUP B BASEMAP



GROUP B – #1 sheet of 2

W (culverts)
H River @ old Kings Hwy
H River @ Patience Brook
West Road
Fresh Brook (2)
Blackfish Creek (2)
Mayo Creek

T (culverts)
Pamet (2)
Little Pamet (3) (Corn Hill, Castle Rd, Rt 6)
Eagle Neck Creek
East Harbor / High Head
Mill Pond Rd

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

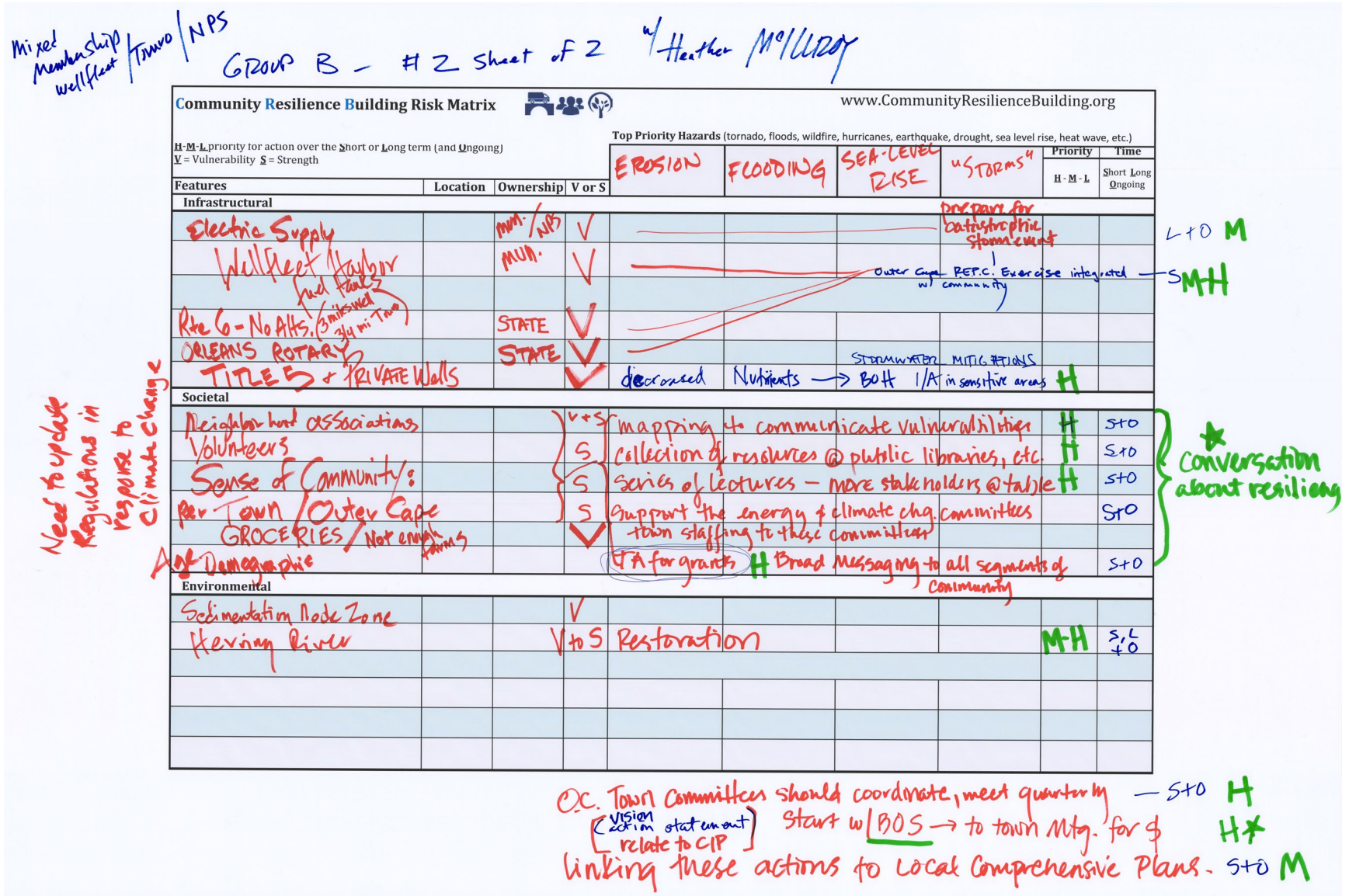
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Erosion	Flooding	Sea Level Rise	"Storms"	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Blackfish Creek @ Rt 6			V+S		Communicate to MADOT			H	O
Route 6 @ Pamet			V						
Wellfleet > OVD So. of Cahoon			V						
Mayo Beach		Mixed*	S+V		moratorium on new infrastructure in floodplain			M	S
Beach Point			S+V						
Culverts Low lying roads			V/V	widen culverts to enable SM to restore → store C ↳ climate chg mitigation || prioritize to seek $ from Town, State, Foundations – S+O				H*	L, O
Societal									
Eroding Ocean Beaches W–T			V						
Shellfish Infrastructure		Mixed*	VS						
First Responders		Mixed Munic/NPS	S	support these community assets		M O	ID vulnerable population timelines – need system	H	S+O
Regional Shelter System			V+S				Triage by messaging ↳ need system		S
AmeriCorps			S						
COA's			S						
Environmental									
Mayo Beach (Barrier Beaches)			S and V	education about natural migration of resources (mitigation), managed retreat S+O				H*	
Beach Point			V	bylaw chgs, zoning changes, moratorium on bldg in floodplain || not make situation worse S+O				H	
Eroding Ocean Bches		Mun/NPS	V	environmental resilience conversation H (S+O) / acquisition of props. – L+O				M	
Wellfleet Gut		Mixed	V+S	notice to people buying props in floodplain & wetlands – S+O				M*	
Pamet River		Mun/NPS	V+S						
Burton Baker			V						

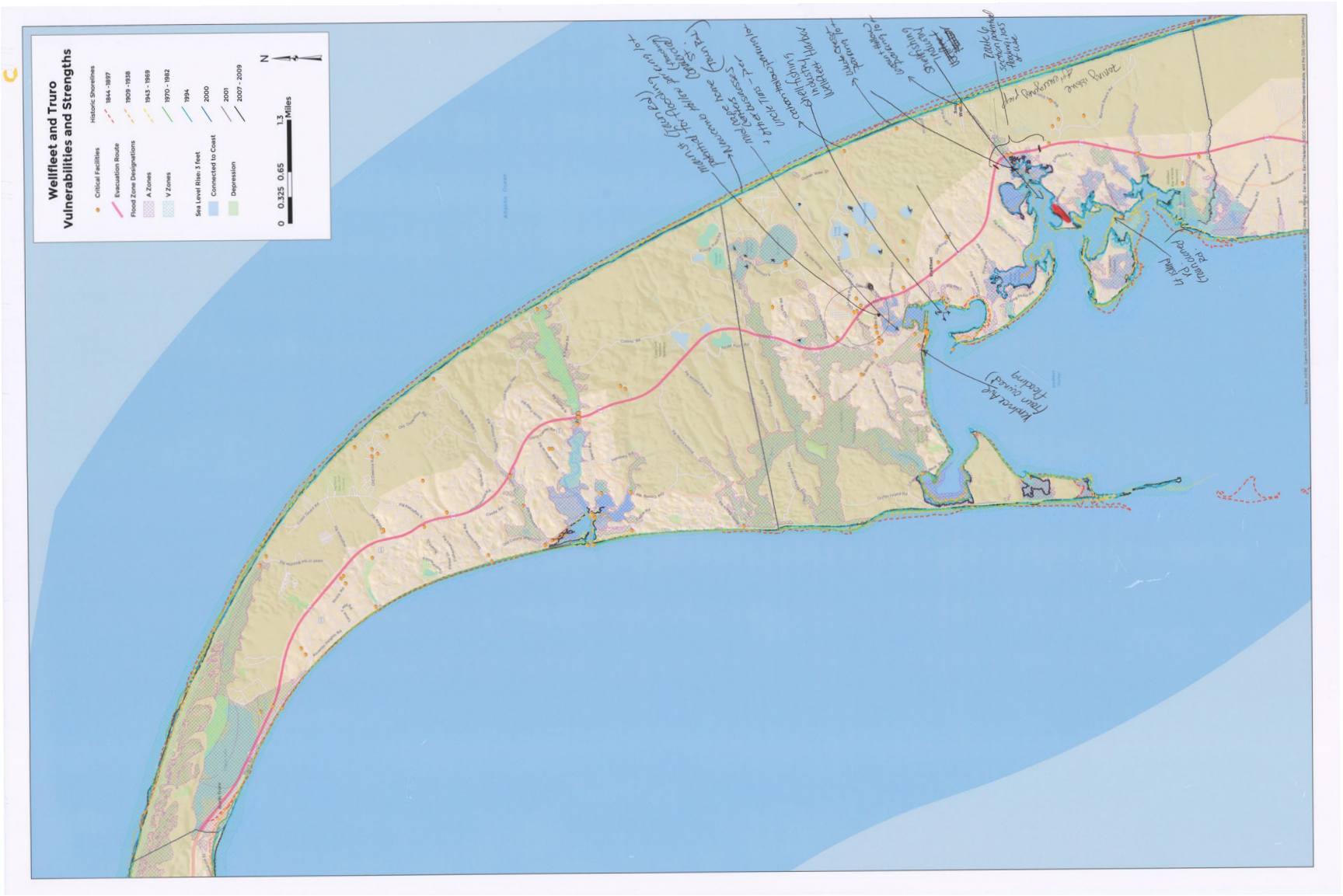
mixed Private and Public Interests

OC. Conservation Agents are working together – continue – S+O !! (yea)

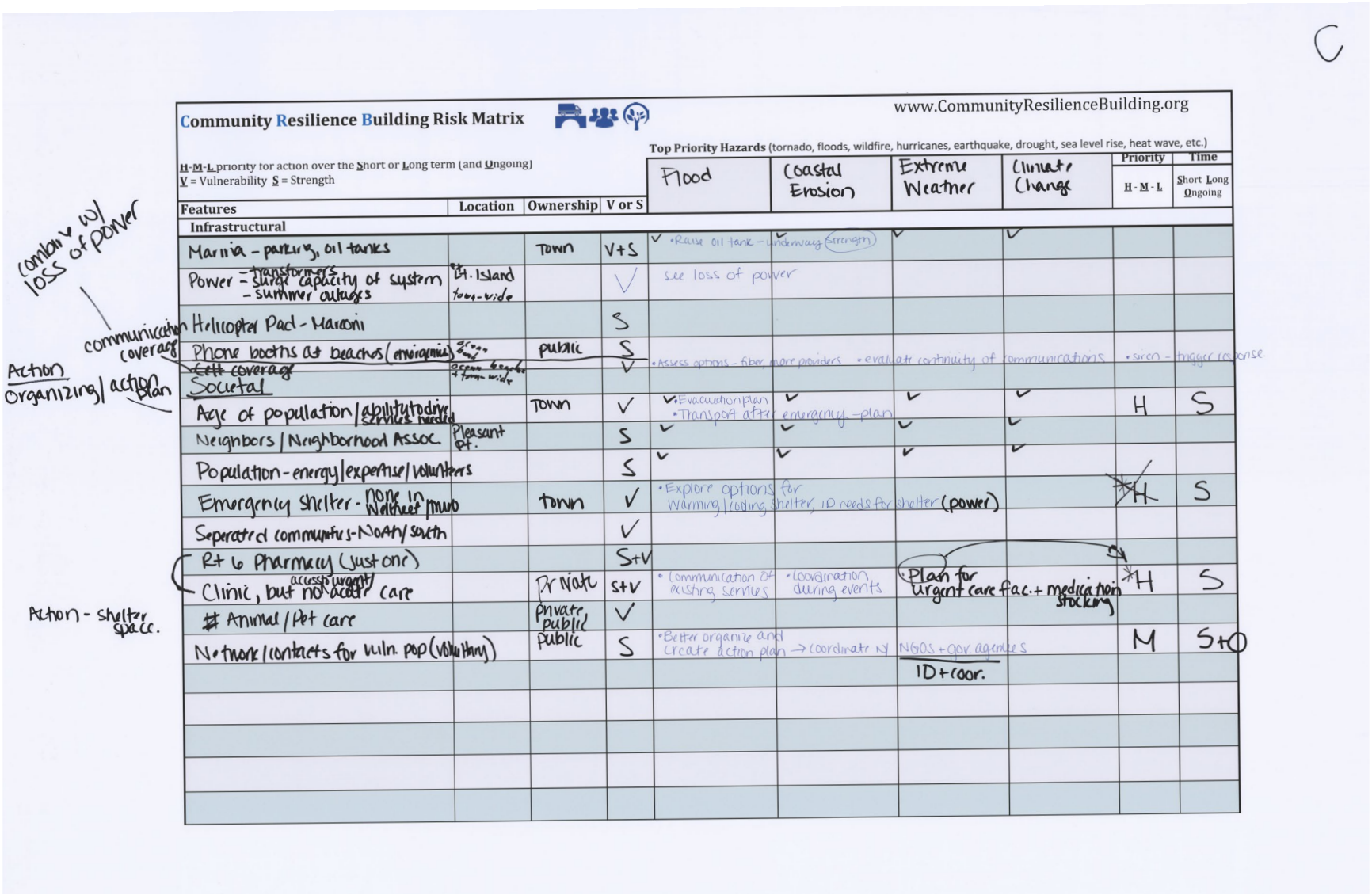
GROUP B RISK MATRIX 1



GROUP B RISK MATRIX 2



GROUP C BASEMAP



Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Flood	Coastal Erosion	Extreme Weather	Climate Change	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Marina – parking, oil tanks		Town	V+S	✓ •Raise oil tank – underway (strength)	✓	✓	✓		
Power – transformers – surge capacity of system – summer outages	*H. Island town-wide		V	see loss of power					
Helicopter Pad – Marconi			S						
Phone booths at beaches (emergency)		public	S						
~~Cell coverage~~	ocean beaches & town wide		V	•Assess options – fiber, more providers	•evaluate continuity of communications			•siren – trigger response	
Societal									
Age of population / ability to drive / services needed		Town	V	✓ •Evacuation plan •Transport after	✓ emergency – plan	✓	✓	H	S
Neighbors / Neighborhood Assoc.	Pleasant Pt.		S	✓	✓	✓	✓		
Population – energy / expertise / volunteers			S	✓	✓	✓	✓		
Emergency shelter – none in Wellfleet / Truro		Town	V	•Explore options for Warming / Cooling Shelter, ID needs for shelter (power)				*H	S
Separated communities – North / South			V						
Rt 6 Pharmacy (just one)			S+V						
Clinic, but not accessible / urgent care		Private	S+V	• Communication of existing services	• Coordination during events	Plan for urgent care fac. + medication stocking		*H	S
# Animal / Pet care		Private / public	V						
Network / contacts for vuln. pop (volunteers)		public	S	•Better organize and create action plan → coordinate NY		NGOS + gov agencies ID + coor.		M	S+O

(combine w/ loss of power)

communication coverage

Action Organizing / action plan

Action – shelter space.

GROUP C RISK MATRIX 1

C

merge two

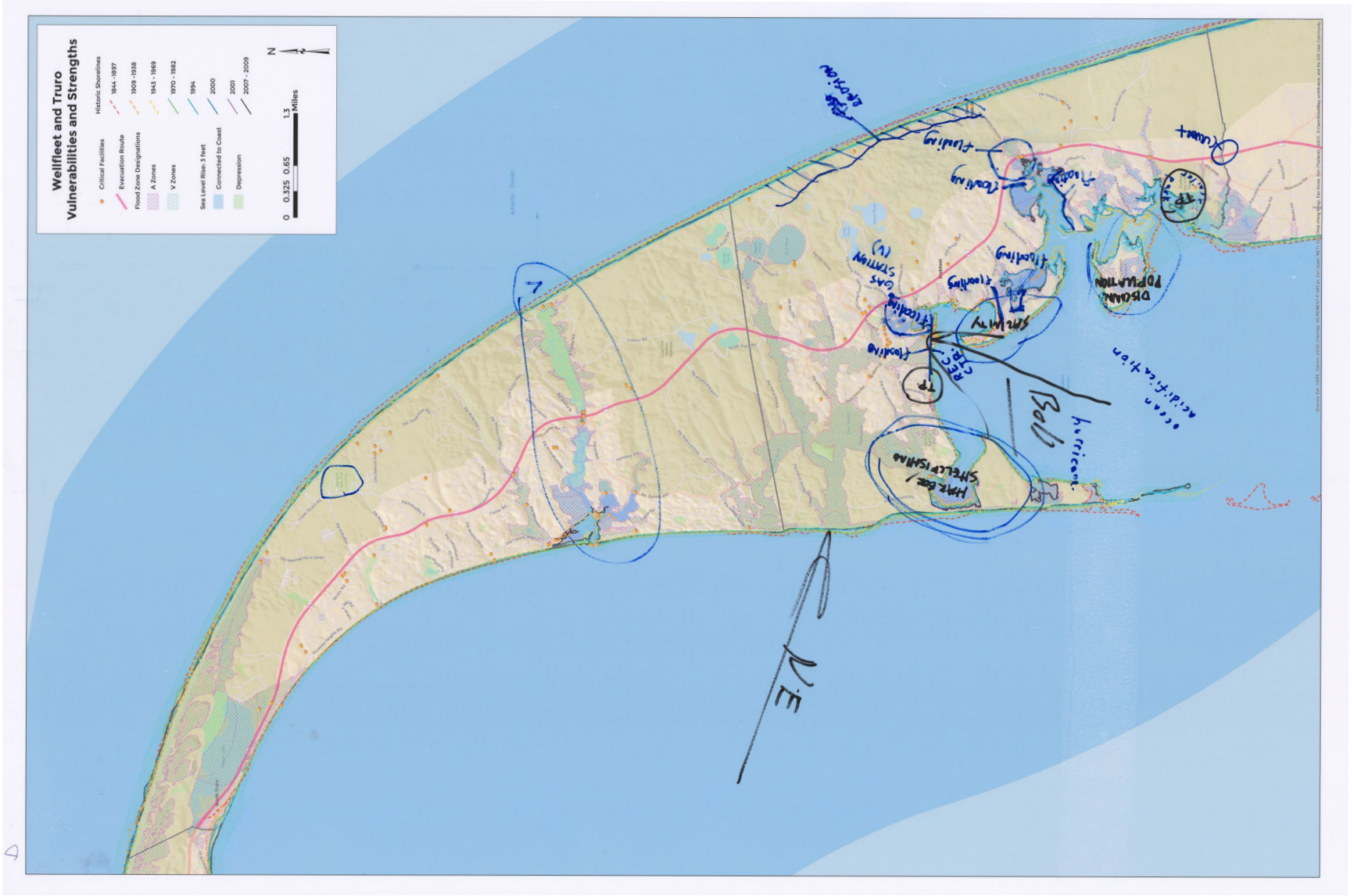
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

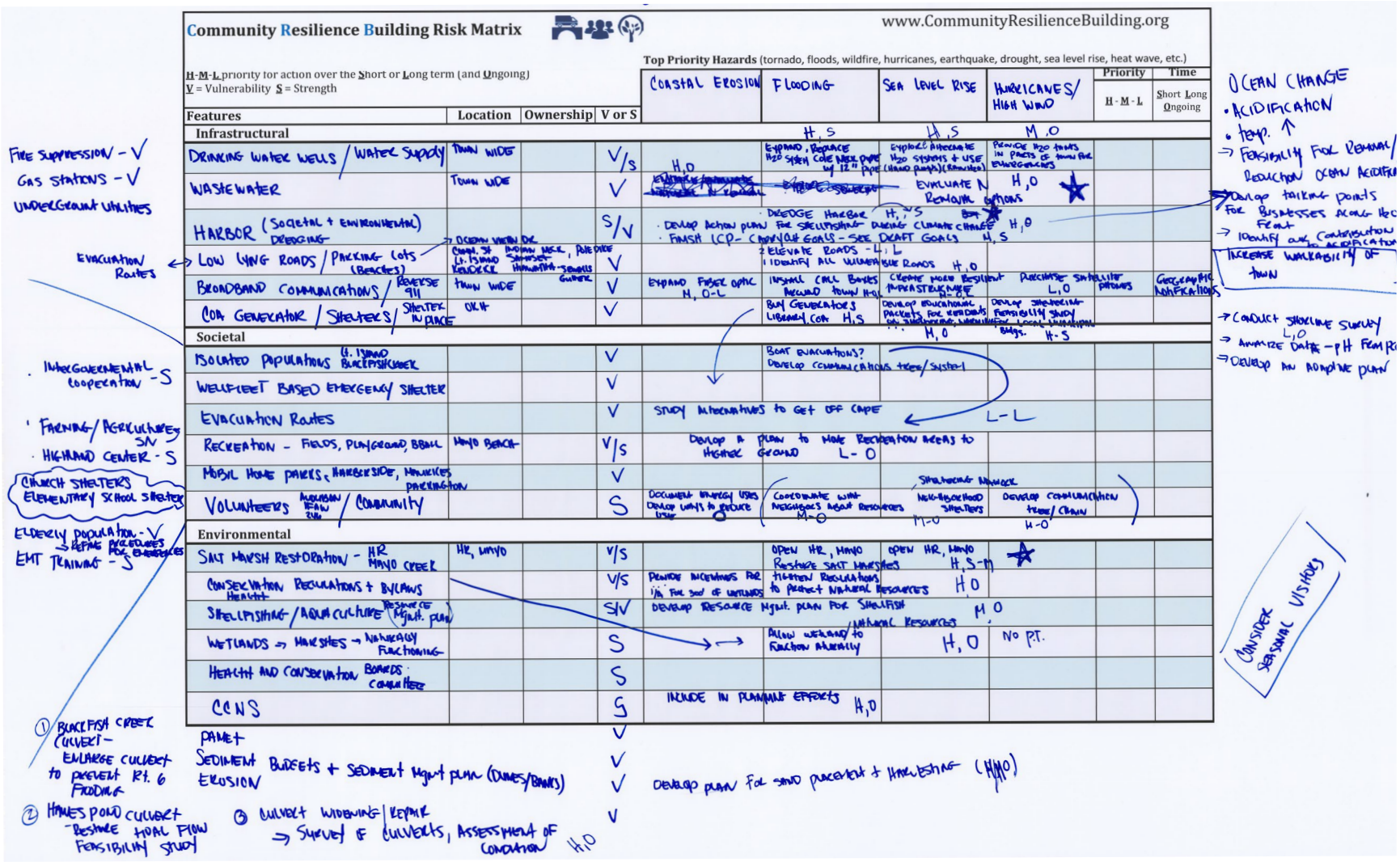
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Flood (rain, ~~SLR~~, surge)	Coastal Erosion	Extreme Weather	Climate change (SLR, drought, species mig.)	Priority H-M-L	Time Short Long Ongoing	
Infrastructural										
Disconnected Roads	Pilgrim Lake, Lt. Island, Orleans Rd., Chequesset	Town, State, Private	V	• Evacuation plan, determine roads that will be disconnected, analysis of most vulnerable ✓	• Demurg [illegible] ✓	• Obtain emergency vehicles that can travel through floods ✓	• Protecting roads – blocking storm path ways (following county study)	*H	S	• Alternate routes – feasibility study. • Collect LIDAR data every
Loss of parking lots	NS, ~~public~~, Ocean lots	public	V/S	• Analysis of strategic retreat, acquisition of property, shuttle to beach ✓ →	Feasibility study (being worked on in Wellfleet) of alternative parking ✓			M	S	(happening now)
Loss of power/communication	Solar generators, power lines	CLC, Eversource, private	V	• Bury lines • Eversource – build, don't repair	• renewable energy • program at eversource for battery storage – expand, ID locations ✓	• develop smartgrid		*H	O	smart grid
Wells/Septic – saltwater intrusion	All	private	V	• Analysis of vulnerable wells/septic ✓	• Feasibility of water system expansion	• Reccs for individual wells, community wells, town system		M	S O	– planning study – implementation
Harbor – dredging needed		town/fed	S+V	• Funds for dredging • Need for clamshell dredge	✓	✓	✓	H	O	
Critical access – route 6 – disconnection	Orleans rd.	State	V	✓		✓				
Societal										
Business impacts, loss of inventory, ability to operate	Lumber, rest., [illegible]	private	V+S	• Assess retreat/elevation ✓	• Local/town planning/guidance for new businesses ✓	✓	✓	M	O	
Shellfish – commercial, aquaculture		private + public	V+S	• Opening new areas for grants	• Info sharing/outreach on town activities ✓ • culvert upgrades to prevent runoff		• Promote/preserve access to grants ✓	H	O	
Tourism		public + private	V+S	• Improve outreach to citizens + visitors ✓	✓	✓	✓	M	O	
Public safety – roads, equip. access for rescue		Town, REPC, Fed, police/fire	V+S	• Obtain adequate equipment to access during events ✓	✓ • Add warming/cooling station	• Awareness about nextbus website ✓	• Explore transportation as a service options →	H*	O	
NGOs – CCS, Friends of HR, others, APCC, Con Trusts, Friends of NS			S							
Gov Orgs – NS, ~~APCC~~, CCC			S							
Resourcefulness of community			S							
Environmental										
Shellfish/finfish – resources		State, town, private	V+S	• Restore Herring River • Encourage Mayo Creek restoration	• Encourage town to continue propogation efforts		✓ • Support monitoring programs.			• Acknowledge use of sustenance food.
Saltwater Intrusion – habitat			V+S	• Encourage estuary water quality improvement						
Rising use/level of ponds	Kelly Ponds	Town, Fed, private	V	✓	• More pond monitoring + maintenance	• Outreach around pond use	✓	L	O	

GROUP C RISK MATRIX 2



GROUP D BASEMAP

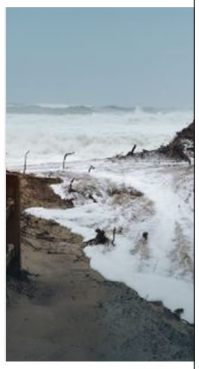


GROUP D RISK MATRIX 1

Municipal Vulnerability Preparedness Workshop

TOWNS OF WELLFLEET AND TRURO

March 12, 2019



Today's Agenda

Morning

- **8:45 Workshop Overview and Introductions** – Hillary Lemos and Emily Beebe
- **9:00 MVP Program Background** – Martha Hevenor
- **9:15 Science, Climate Projections, Resources** – Greg Berman
- **9:35 Short Break**
- **9:45 Small Team Exercise**
  - Team Orientation
  - Discuss and Identify Priority Hazards
  - Identify Vulnerable Features and Strengths
  - Prepare for Report-out
- **11:15 Break**
- **11:30 Teams Report on Hazards, Vulnerabilities, Strengths**
- **12:00 Summary Discussion**
- **12:15 Lunch!**

Today's Agenda

Afternoon

- **12:45 Small Team Exercise**
  - Discuss and Identify Actions
- **1:45 Short Break**
- **1:50 Small Team Exercise (continued)**
  - Identify Priority and Urgency of Actions
  - Prepare for Report Out
- **2:30 Break**
- **2:45 Small Teams Report on Top Actions**
- **3:00 Summary Discussion – Compile Top Actions**
- **3:30 Wrap Up and Next Steps**
- **Adjourn!**

Project Team

MVP PROVIDER | CAPE COD COMMISSION

- Sharon Rooney - *Chief Planner*
- Heather McElroy - *Natural Resources Manager*
- Erin Perry – *Deputy Director*
- Chloe Schaefer - *Community Design Planner*
- Martha Hevenor - *Planner II*
- Anne Reynolds - *GIS Director*

MVP PROVIDER | COOPERATIVE EXTENSION

- Greg Berman - *Coastal Processes Specialist, Woods Hole Sea Grant/ Cape Cod Cooperative Extension*
- Shannon Jarbeau - *Floodplain Specialist & CRS Coordinator, Woods Hole Sea Grant/Cape Cod Cooperative Extension*

TOWN PROJECT MANAGERS

- Hillary Lemos –*Wellfleet Health and Conservation Agent*
- Emily Beebe – *Truro Health/Conservation Agent*

WORKSHOP PRESENTATION

MVP Program Background

EXECUTIVE ORDER 569: AN INTEGRATED CLIMATE CHANGE STRATEGY FOR THE COMMONWEALTH 9.16.16

- Reducing greenhouse gas emissions to combat climate change
- Preparing for the impacts of climate change
  - State Adaptation Plan
  - Agency Vulnerability Assessments
  - Municipal Support
  - Climate Coordinators

4

ENVIRONMENTAL BOND BILL, 3.15.18

- $1.4 billion bond bill with focus on climate change resiliency
- $300 million for climate change adaptation
- Codifies EO 569

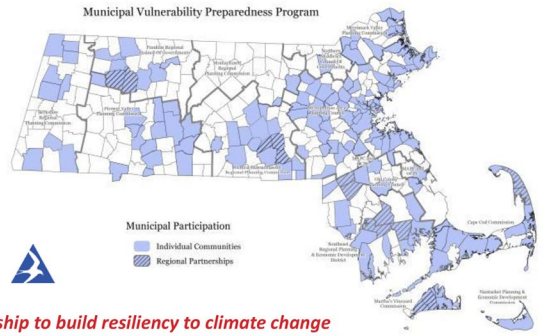
5

- www.resilientma.com
- **Integrated Plan:** First in the nation Climate Adaptation and Hazard Mitigation plan
- **Mainstreaming climate change**: Incorporating climate change into current planning, budgeting, and policy frameworks

WORKSHOP PRESENTATION

Municipal Vulnerability Preparedness (MVP)

2017-2019



State and local partnership to build resiliency to climate change

1. Engage Community
2. Identify CC impacts and hazards
3. Complete assessment of vulnerabilities & strengths
4. Develop and prioritize actions
5. Take Action

7

MVP 2018

- 82 new planning grants, now 43% of the Commonwealth
- 39 Action Grant projects
- $7.2 million dollars committed
- Have budgeted $10 million for action grants next year in Governor Baker's Capital Plan

29

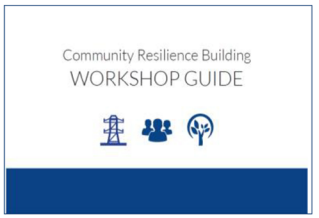
MVP Action Grant

- **Who's eligible?**
  - Municipalities with MVP designation
  - Municipalities completing 2017 MVP process who have completed workshop(s) and have identified prioritized actions
- Funding: $10,000 - $400,000 per project
- Match: At least 25% of total project cost required

25

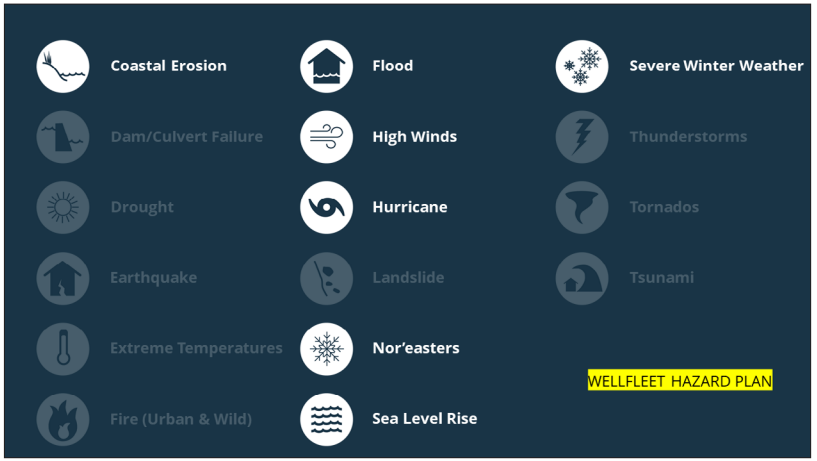
MVP Principles

- **Community-led process** that employs local knowledge and requires local buy-in and support
- **Accessible**
- **Utilizes partnerships** and leverages existing efforts
- **Mainstreams** climate change
- **See communities** as local innovators
- **Frames** coordinated statewide efforts.

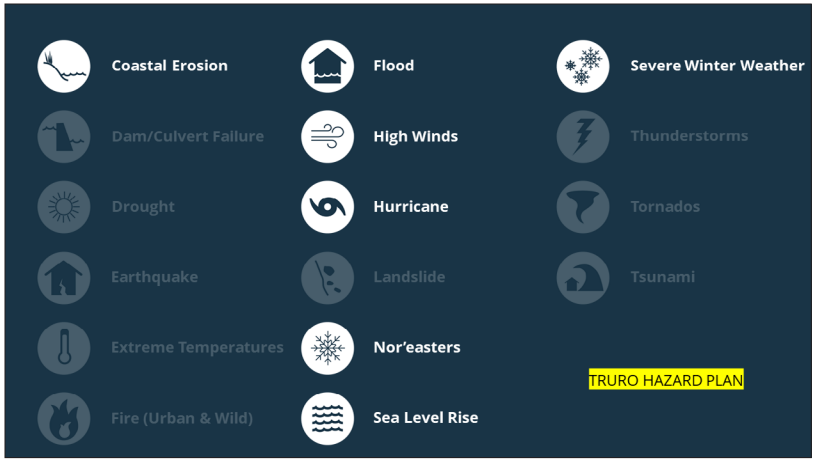


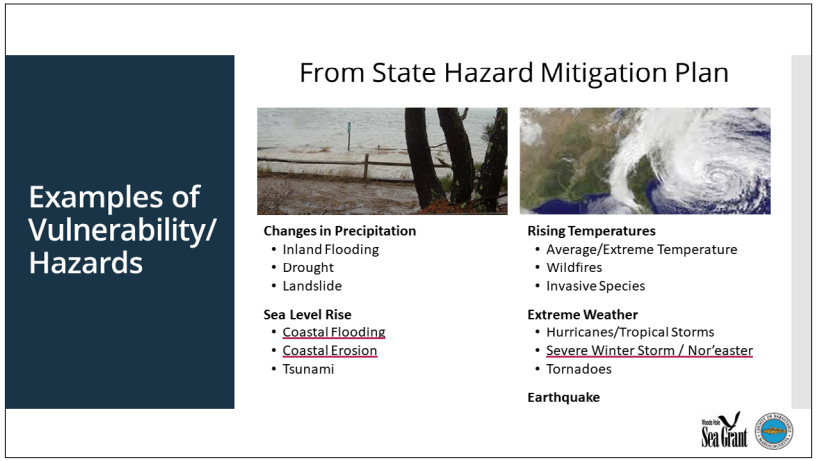
8

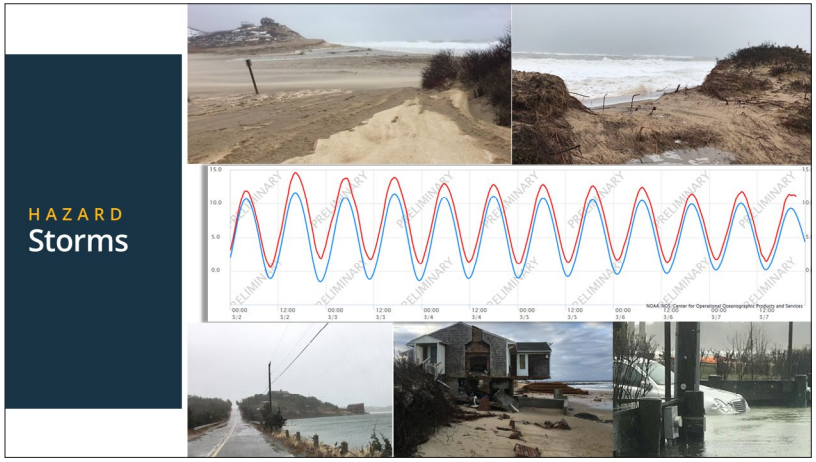
WORKSHOP PRESENTATION

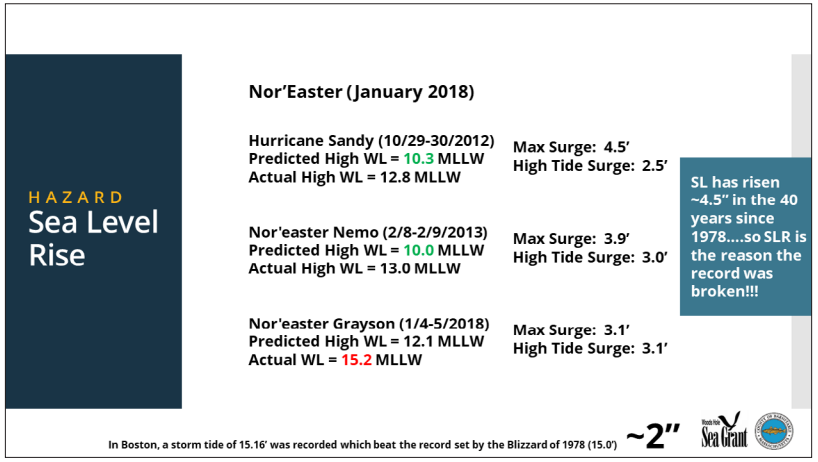


WORKSHOP PRESENTATION

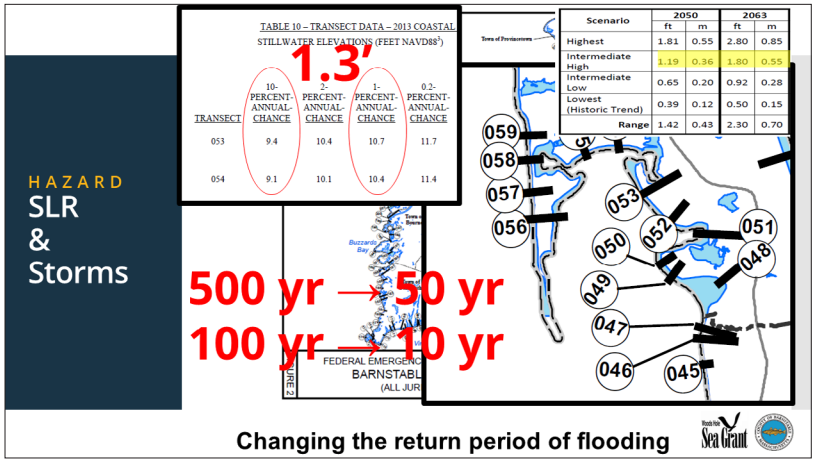


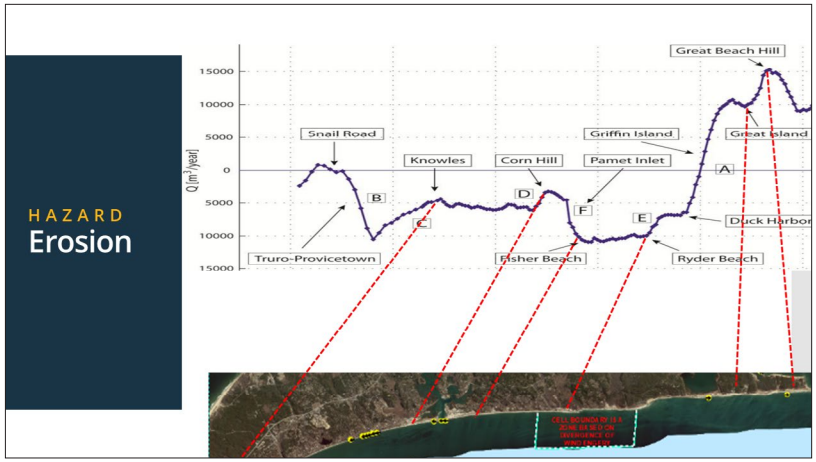






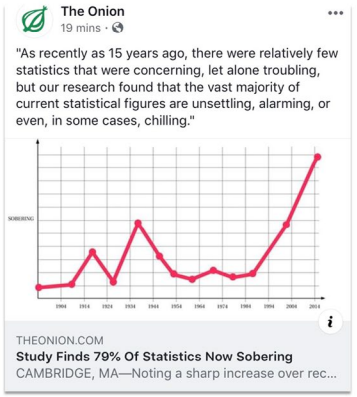
WORKSHOP PRESENTATION

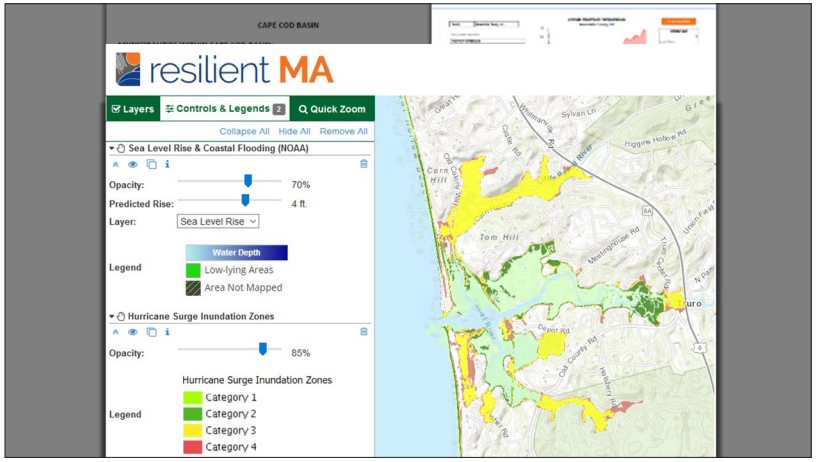


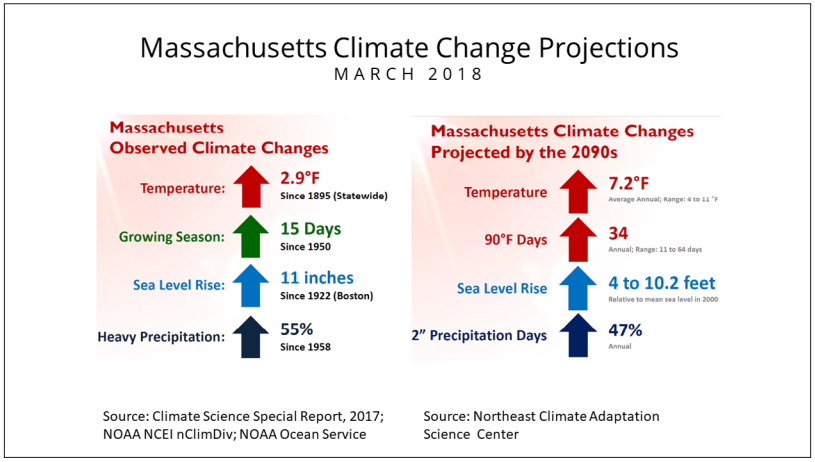


WORKSHOP PRESENTATION

Overview of Data and Maps

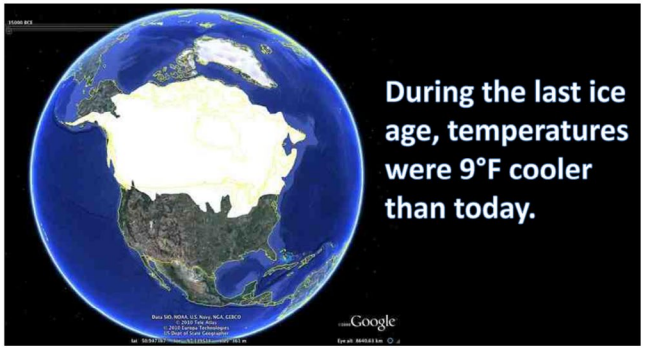




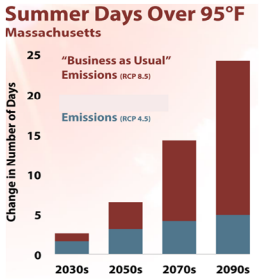


WORKSHOP PRESENTATION

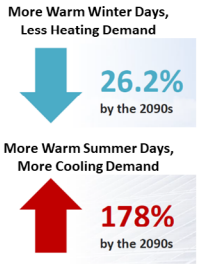
Massachusetts Climate Changes Projected by the 2090s | **Temperature** ↑ 7.2° F Average Annual



Massachusetts Climate Changes Projected by the 2090s | **Temperature** ↑ 7.2° F Average Annual ↑ 34 Annual

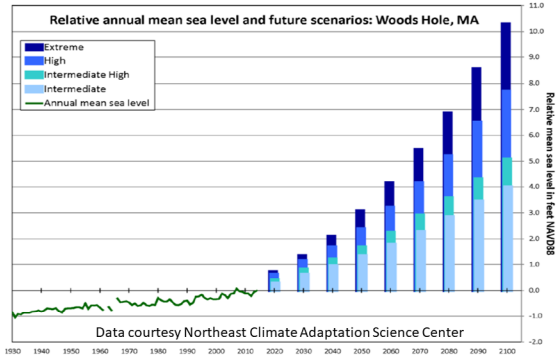


Data courtesy A. Karmalkar, Northeast Climate Adaptation Science Center. Figure by D. Brown

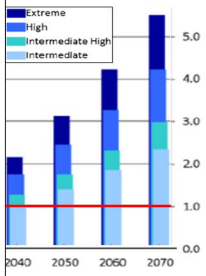


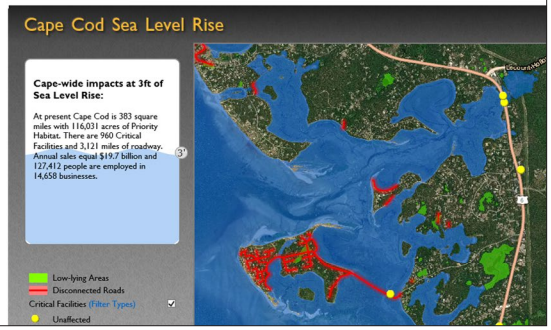
Source: Northeast Climate Adaptation Science Center, ResilientMA.org, accessed 2018.

Massachusetts Climate Changes Projected by the 2090s | **SLR** ↑ 4 to 10.2 feet Relative to mean sea level in 2000

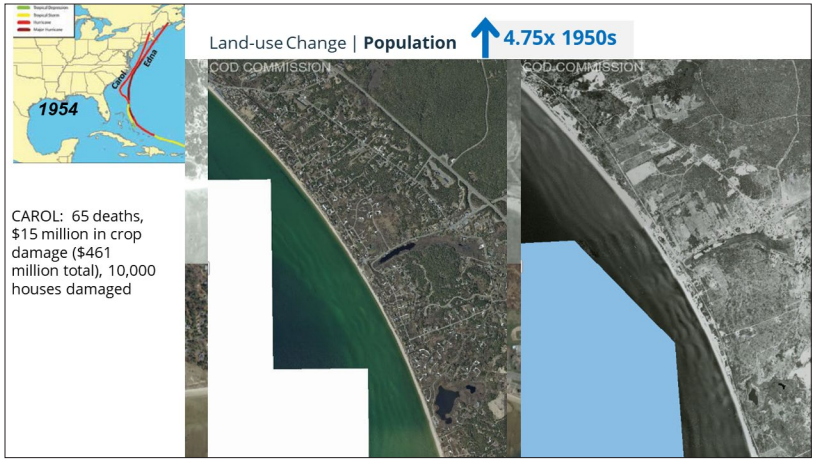


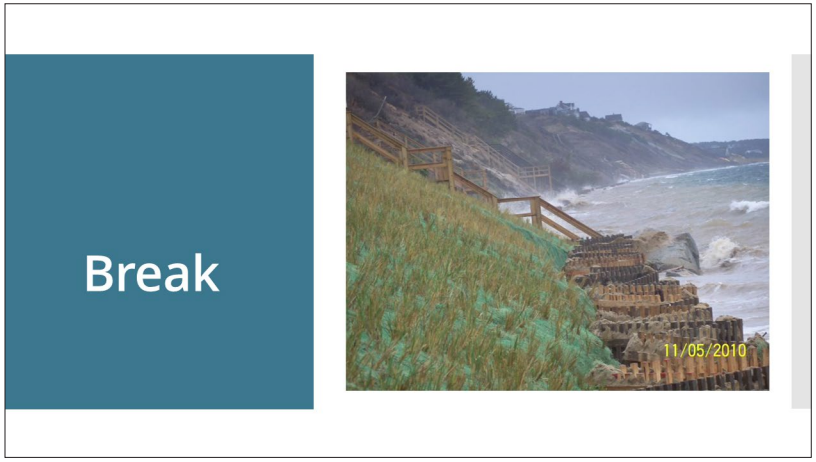
Massachusetts Climate Changes Projected by the 2090s | **SLR** ↑ 4 to 10.2 feet Relative to mean sea level in 2000

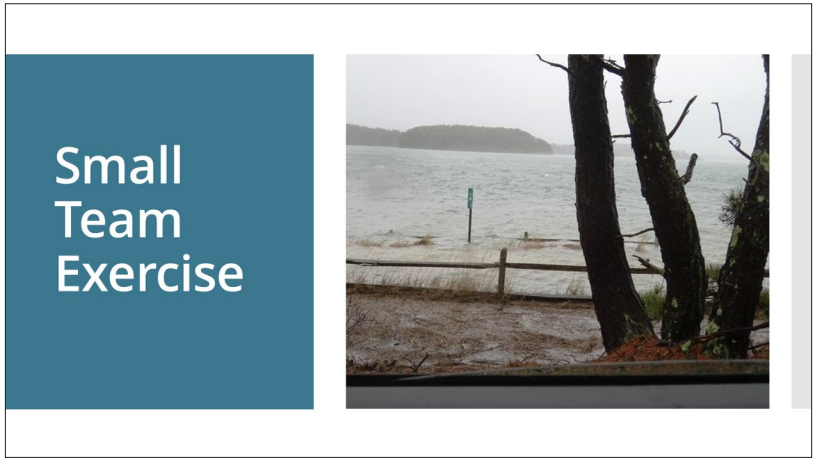




WORKSHOP PRESENTATION







WORKSHOP PRESENTATION

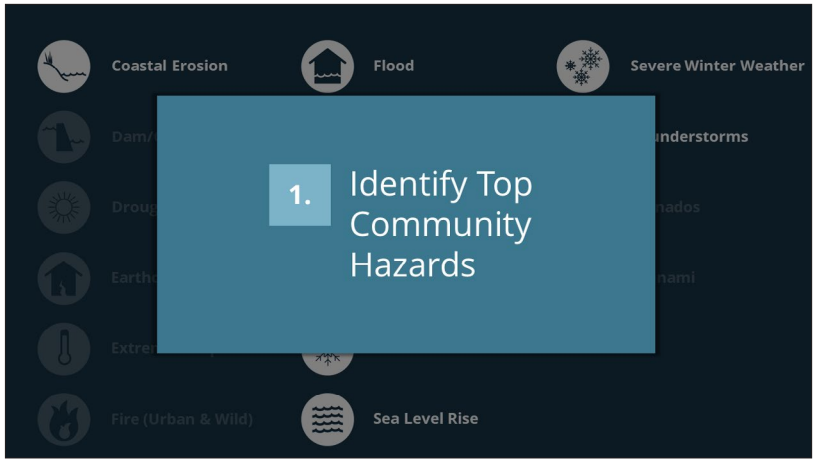
Small Team Exercise

OVERVIEW

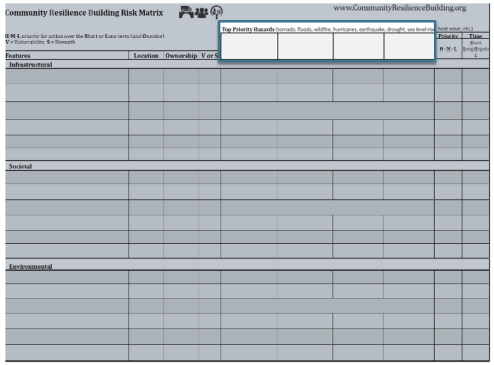
- Introductions
- Identify Small Team Spokesperson
- Clarifying Questions

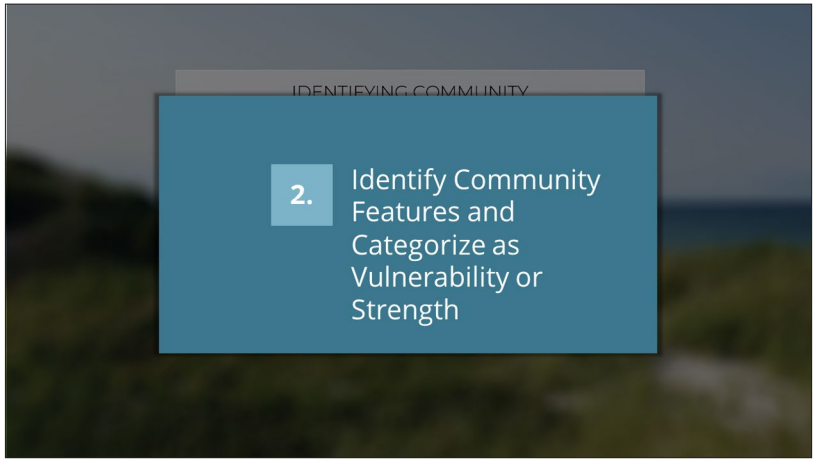
EXERCISE

1. Identify Top Community Hazards
2. Identify Community Features and Categorize as Vulnerability or Strength
   - Infrastructure
   - Societal
   - Environmental
3. Identify Location and Ownership on Map/Matrix

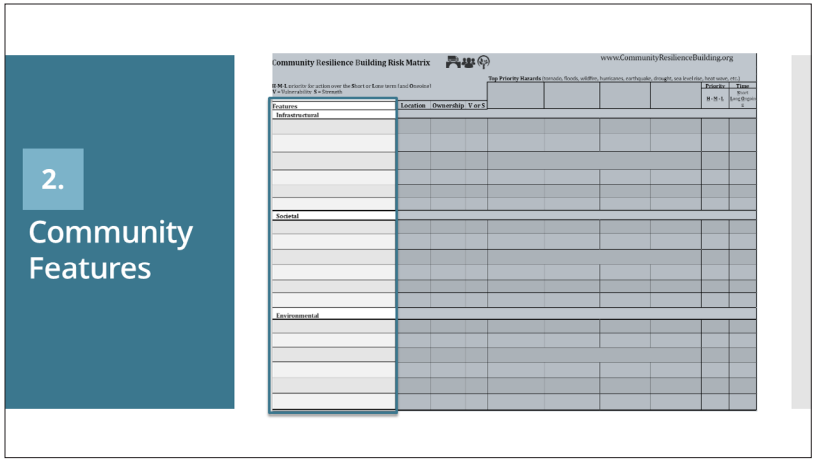


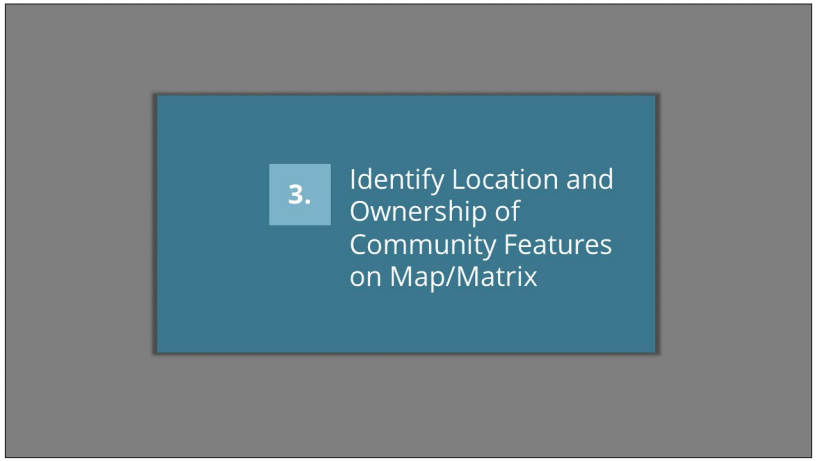
1. Top Community Hazards

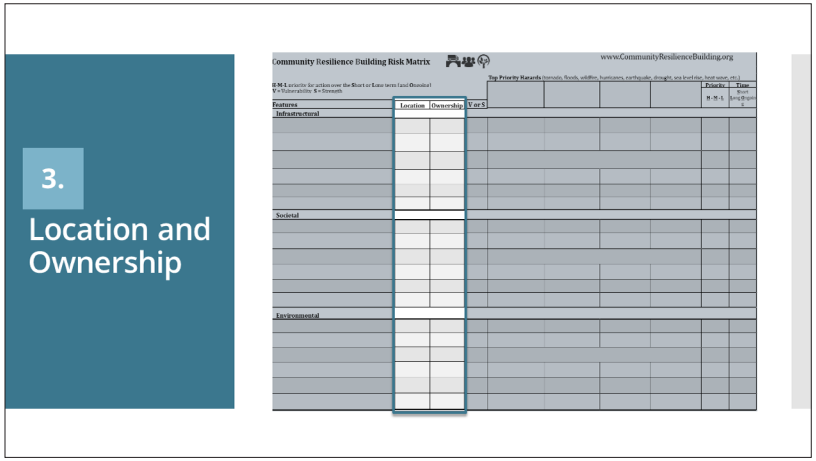




WORKSHOP PRESENTATION







WORKSHOP PRESENTATION

Small Team Exercise

OVERVIEW

- Introductions
- Identify Small Team Spokesperson
- Clarifying questions

EXERCISE

1. Identify Top Community Hazards
2. Identify Vulnerabilities and Strengths of Community Features
   - Infrastructure
   - Societal
   - Environmental
3. Identify Location and Ownership of Community Features on Map/Matrix

Break

Small Teams Report Out

Summary Discussion

WORKSHOP PRESENTATION

Lunch!

Today's Agenda

Afternoon

- 12:45 **Small Team Exercise**
  - Discuss and Identify Actions
- 1:45 **Short Break**
- 1:50 **Small Team Exercise** (continued)
  - Identify Priority and Urgency of Actions
  - Prepare for Report Out
- 2:30 **Break**
- 2:45 **Small Teams Report on Top Actions**
- 3:00 **Summary Discussion – Compile Top Actions**
- 3:30 **Wrap Up and Next Steps**
- **Adjourn!**

Small Team Exercise

Small Team Exercise

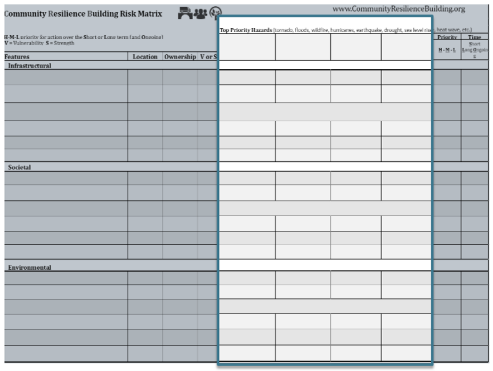
OVERVIEW

- Identify Small Team Spokesperson
- Clarifying questions

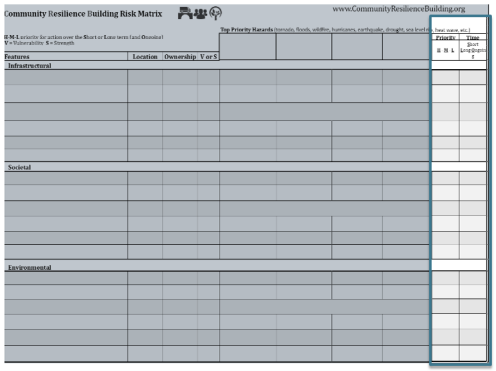
EXERCISE

1. Identify Actions to Reduce Vulnerability or Reinforce Strengths
2. Assign Priority and Urgency of Each Action
   - Infrastructure
   - Societal
   - Environmental
3. Identify Top 3 -4 Priority Actions

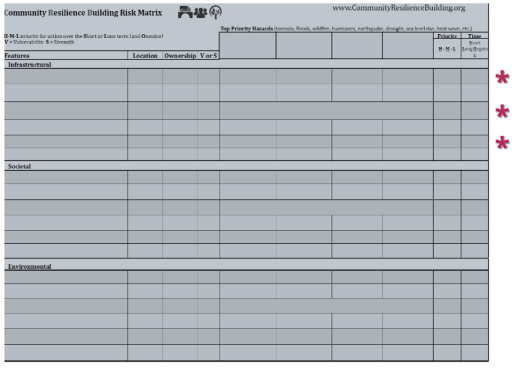
1. Identify Actions



2. Assign Priority and Urgency



3. Identify Top Priority Actions



Small Team Exercise

OVERVIEW

- Identify Small Team Spokesperson
- Clarifying questions

EXERCISE

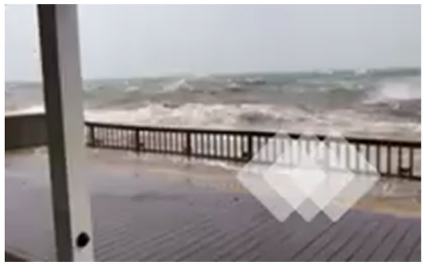
1. Identify Actions to Reduce Vulnerability or Reinforce Strengths

SHORT BREAK

2. Assign Priority and Urgency of Each Action
   - Infrastructure
   - Societal
   - Environmental
3. Identify Top 3 -4 Priority Actions

WORKSHOP PRESENTATION

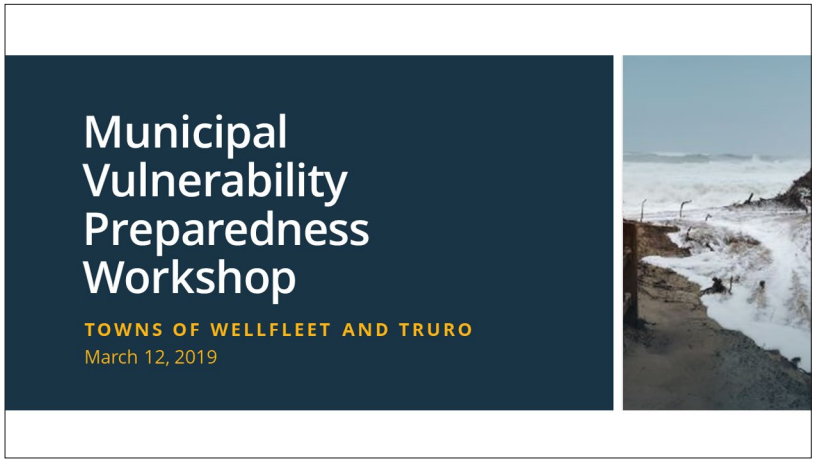
Break



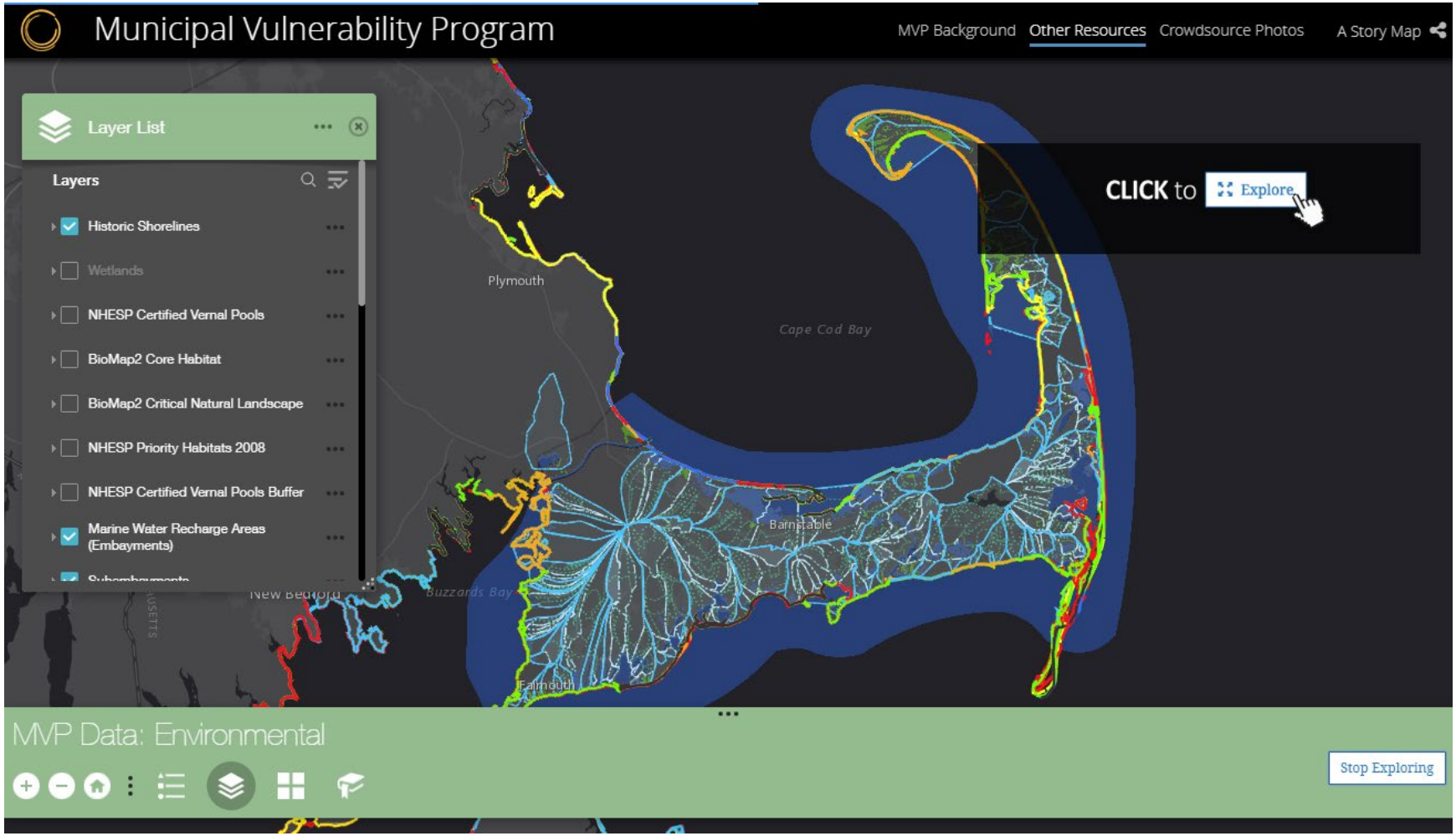
Small Teams Report Out on Top Priority Actions

Summary Discussion – Compile Top Actions

Wrap-up and Next Steps



WORKSHOP PRESENTATION



MVP STORYMAP (available at https://arcg.is/1CX4K9)

Community Resilience Building Risk Matrix — **HIGH Priorities** — www.CommunityResilienceBuilding.org

Master Matrix

H-M-L priority for action over the **S**hort or **L**ong term (and **U**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Erosion	Sea Level Rise	Flooding	Storms	Group (A (Truro), B (Mixed), C (Mixed), D (Wellfleet))	Priority (H-M-L)	Time (Short Long Ongoing)
Infrastructural										
Culverts -	**Several locations - see map**	**Public**	**V**	**Repalce culverts, with potential road elevation ((Truro Center Road, Mill Pond, Little Pamet)**				**A**	**H**	**Ongoing**
Well Water/Reliance on well water	**Town-wide**	**N/A**		**Provide water "buffalos" for emergencies (1) and pursue municipal water supply (2)**				A	H (1), L(2)	S(1), L (2)
Beach parking lots	**see map**	**Public**	**V**	**Partner with CCNS and RTA to provide and promote shuttle to beaches**				**A**	**H**	S -O
Regional Shelter	Provincetown	Public	S & V	Provide training/staffing for volunteers & explore potential additional capacity				A	H	S&L
Communications/broadband	**Townwide**	**Multiple**	**V**	**Public education on emergency preparedness. Pursue complete coverage of broadband.**				**A**	**H**	**O**
Electrical supply	Townwide	Public utility	V	Work with Eversource and tree companies to trim trees.				A	H	S
Culverts/low-lying roads (C: Herr,River@ OKH & Patience Brook; West Road, Fresh Brook (2), Blackfish Creek (2), Mayo Creek; Pamet (2);Little Pamet (3), Eagle Neck Creek, East Harbor/High Head, Mill Pond Rd	see map	Mixed -	S & V	Widen culverts to enable salt marsh restoration & Carbon storage; prioritize & seek funding from Town, State, foundations, etc.				B	H	S & O
Culverts - Blackfish Creek @ Rte 6, Rte 6 @ Pamet & Wilders			V/S, V	Communicate with MasasDOT				B	H	O
Title V & Private Wells		Mixed -	V	Decrease nutrients - BOH - I/A systems in sensitive areas				B	H	
Disconnected Roads & critical access (Rte 6)	**Lieut.Island, Orl.rotary, Chequesset**	**Town, state, private**	**V**	**Several actions: evacuation plan, determine which roads will be disconnected, alternate routes, protecting roads from flooding**				**C**	**H**	**S**
Loss of power/communitcation	**Solar generators, power lines**	**Eversource, CLC, private**	**V&S**	**Bury lines, develop smartgrid, renewable energy, program at Eversource for battery storage**				**C**	**H**	**O**
Wellfleet Harbor		town, fed	V	Pursue funds for dredge, need clamshell dredge				C	H	O
Drinking Water/Wells	Townwide		V/S	Expand, replace Coles NeckH2O system with 12" pipe;explore alternate H2O systems				D	H	S
Wastewater	**Townwide**		**V**	**Evaluate nitrogen removal options**				**D**	**H**	**O**
Low lying roads & beach prking lots	Comm. St, Indian Neck. Lt Isl, Kendrick, etc.		V	Identify vulnerable roads, elevate roads				D	H	O, L
Harbor			**V&S**	**Dredge harbor, develop action plan for shellfishing during climate change**				**D**	**H**	**S & O**
COA generator/shelters			**V**	Buy generators for library, COA, etc., develop educational packets for residents, develop shltering feasibility study for sheltering				**D**	**H**	**S**

MASTER MATRIX (PAGE 1)

Societal							
Fluctations in tourism	townwide		V	Develop communitications/marketing plan to improve implementation of Rave system	A	H	S
Seasonal population	townwide & campgrounds	private	V & S	See communications above - evacuation	A	H	
Farmlands -farmer markets, gardens	townwide	private		See communications	A	H	s/o
Elderly population	townwide	private/public	V	See communications suggestion above	A	H	O
First responders		town/NPS	S	Support these community assets - ID vulnerable populations - need system	B	H	S & O
Regional shelter system			V&S	" Triage by messaging system - need system	B	H	S
Neighborhood Associaitions, Volunteers			S	Mapping to communicate vulnerabilities, collection of resources at public libraries, series of lectures, more stakeholders	B	H	S & O
Sense of community			**S**	**Outer Cape Town committees should coordinate & meet monthly about the community's resiliency needs to develop a strategy for seeking Town Meeting funding for address climate change impacts. Support the Energy and Climate Change committees with town staffing.**	**B**	**H**	
Shellfish - comercial, aquaculture		public & private	S&V	Open new areas for grants, promote & preserve access, culvert upgrades to prevent runoff.	C	H	O
Public Safety		**Town, REPC**	**S&V**	**Obtain adequate equipment to provide access during events**	**C**	**H**	O
Age of population-			V	Evacuation plan, transport after emergency plan	C	H	S
Route 6 OCHS Clinic			S&V	Plan for urgent care facility & stocking of medications	C	H	S
Environmental							
Pamet River tidal flow	See map	CCNS, Town, private	V/S	See culverts action; Pursue alternative actions to mitigate flooding. dredging - collect data & on tidal system.	A	H	
Pamet Harbor	on map	Public	V/S	Dredging	A	H	O
Barrier beaches - Mayo Beach & Beach Point	Mayo -W, Beach Point -T	Mixed	S & V	Provide education about natural mitigation & migration of resources, managed retreat, and pursue regulatory changes, zoning changes, moratorium on bldg in floodplain - so as to not make situation worse	B	H	s & o
Salt Marsh restoration - herring river, Mayo creek			S&V	Open Herring River, Mayo, restore salt marshes	D	H	S-M
Dunes & banks - Sediment budgets			S	Develop plan for sand placement and harvesting	D	H	O
Blackfish Creek -culvert, Hawes pond culvert			S	Enlage Blackfish Creek culvert to prevent Rte 6 flooding; feasibility study for restoring tidal flow, also culvert assessment	D	H	O

MASTER MATRIX (PAGE 2)

TOWNS OF WELLFLEET & TRURO
COMMUNITY RESILIENCE BUILDING WORKSHOP
SUMMARY OF FINDINGS

PREPARED BY THE CAPE COD COMMISSION & CAPE COD COOPERATIVE EXTENSION

US MAIL: P.O. BOX 226 (3225 MAIN STREET), BARNSTABLE, MASSACHUSETTS 02630

PHONE: (508) 362-3828 • FAX: (508) 362-3136 • EMAIL: FRONTDESK@CAPECODCOMMISSION.ORG

www.capecodcommission.org