Using Weather & Social Data to Inform Participatory Planning Initiatives

Mary Austerman, Coastal Community Development Specialist
New York Sea Grant, Cornell University
Environmental and Energy Study Institute's
Climate Adaptation Data Briefing Week
April 17, 2020

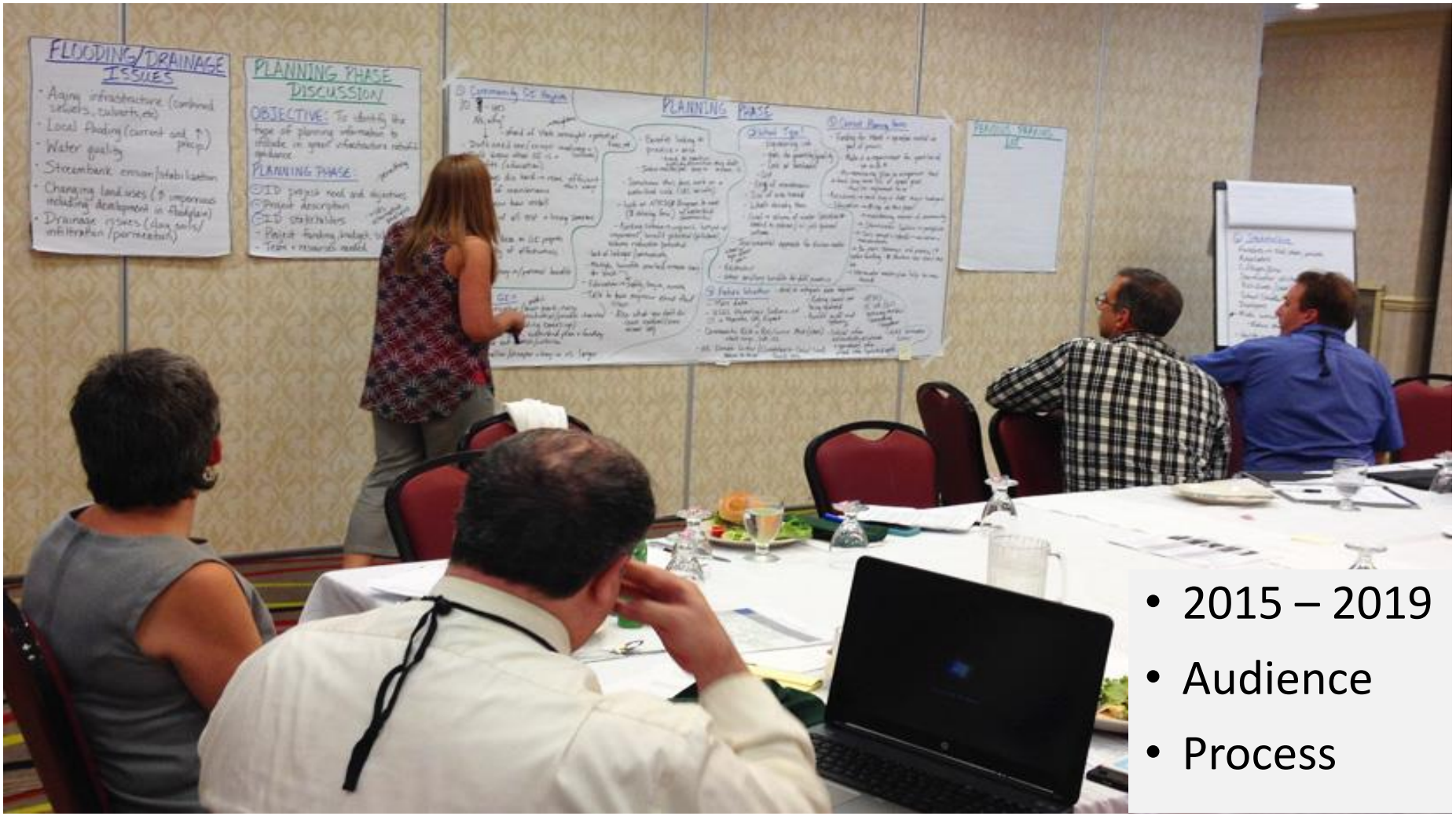
What is New York Sea Grant (NYSG)?

- 33 Sea Grant programs in US
- NYSG founded in 1971
- State-wide network of integrated research, education, & extension services promoting:
  - Coastal economic vitality
  - Environmental sustainability
  - Citizen awareness & understanding about NY's marine & Great Lakes resources

Photo: NYSG


Lake Ontario
Oswego
Newark
Buffalo
Lake Erie
Ithaca
Kingston
Stony Brook
Long Island Sound
NYC

Climate Adaptation Tool Development

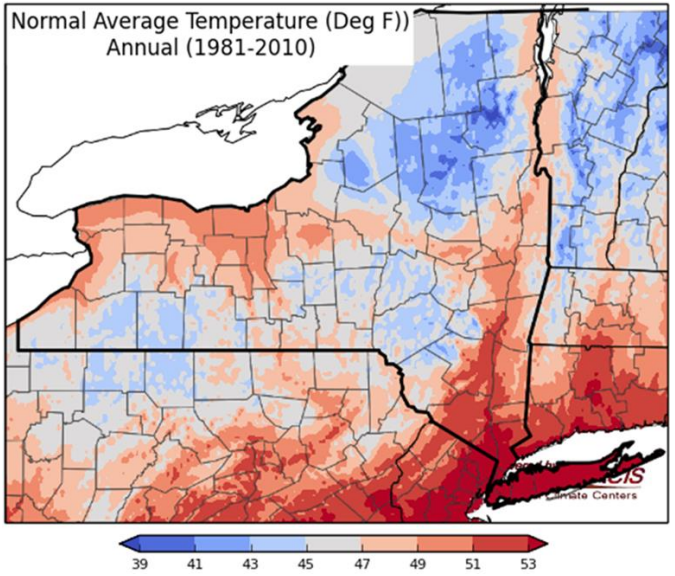


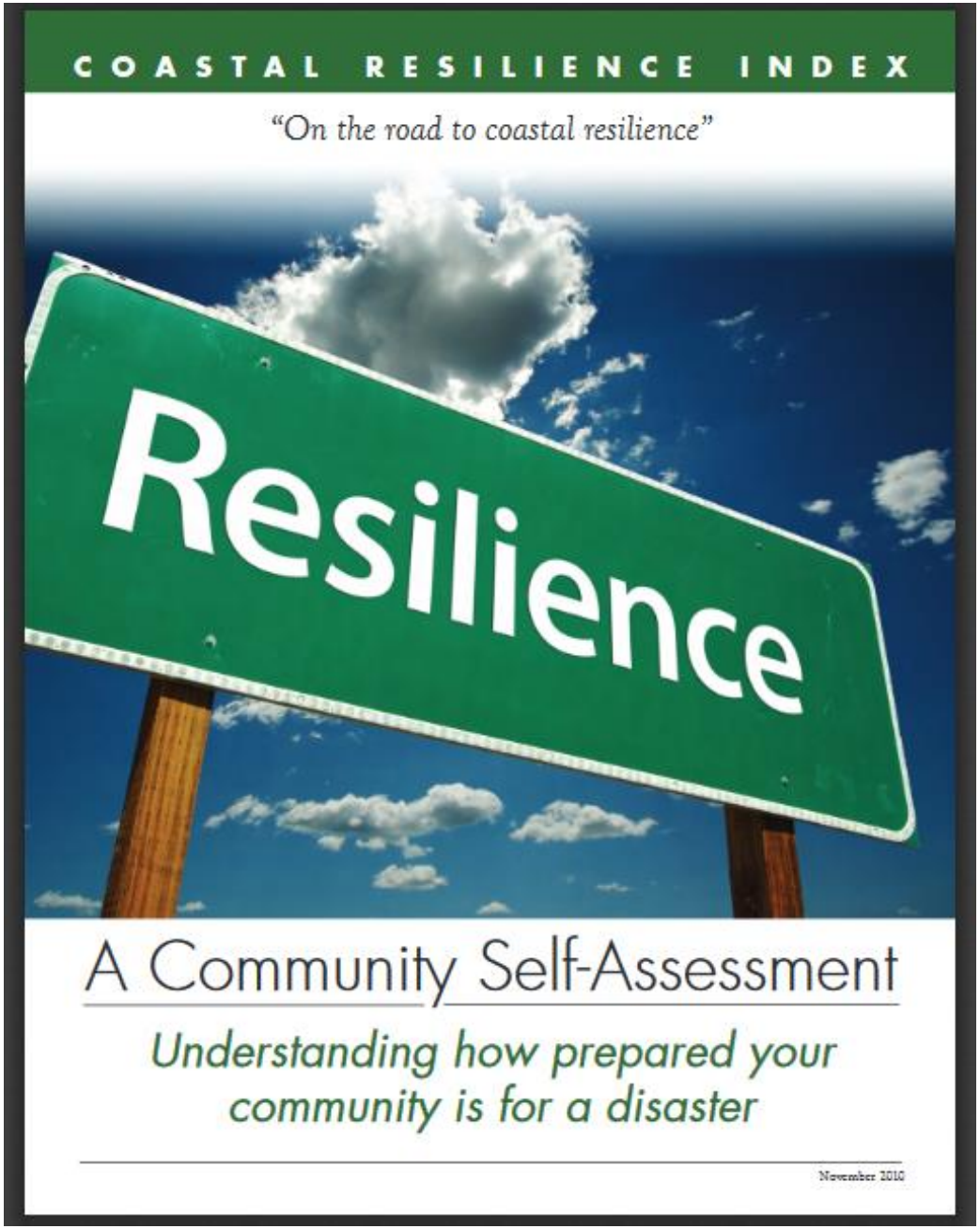
- 2015 – 2019
- Audience
- Process

Funding: National Oceanic & Atmospheric Administration's Climate Change Capacity Building Initiative

Annual Temperature in the Great Lakes Climate Division
Annual Average by Decade (degrees F)

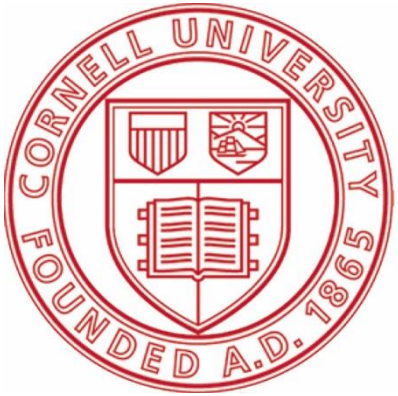
1895-1899	45.84
1900-1909	45.08
1910-1919	45.05
1920-1929	45.06
1930-1939	46.13
1940-1949	45.99
1950-1959	46.28
1960-1969	45.29
1970-1979	45.57
1980-1989	46.03
1990-1999	46.81
2000-2009	47.08
2010-2014	47.79





Integrating Social & Physical Sciences

Department of State



Department of Environmental Conservation

Northeast Regional Climate Center

New York's Great Lakes Coastal Resilience Index

A Community Self-Assessment

Understanding how prepared your community is for coastal-flooding and weather disasters

Sea Grant New York

New York Sea Grant
Wayne County Cooperative Extension
1581 Route 88 North
Newark, NY 14513-9739
(315) 331-8415

New York's Great Lakes Coastal Resilience Index

www.nyseagrant.org

To access the NY GL CRI visit: https://seagrant.sunysb.edu/coastalcomm/pdfs/CCD-CoastalResiliencyIndex.pdf

Benchmark: July 12, 2006

Location: Wayne County

Benchmark Conditions: Over 5 inches of rain fell over a 3–6 hour period. This rainfall total has a one percent probability of occurring in a given year, making this a 100-year rainfall event.

Credible Worst-Case Scenario Conditions: A 500-year event would result in 10 inches of rain over 3-6 hours. Islip, NY experienced 9 inches of rain over 2 hours in 2014.

Flash Flood from Heavy Precipitation

Variables	Benchmark: July 12, 2006	Worst-Case Scenario
Rain (inch)	5+ inches over 3-6 hours	10 inches over 3–6 hours (9" occurred in 2 hours in Islip, NY in 2014)
X Year Event	100 year rain event; 25 year rain event at Macedon (Wayne County)	500 year rain events
Event Duration	One Day	
River Crest Height	Crest heights are not representative because the flood waters weren't on gaged streams	
Injuries	None reported	There is no way to estimate, but more likely to occur with a 500 year event.
Death Toll	None reported	There is no way to estimate, but more likely to occur with a 500 year event.
Number of People Evacuated	6 homes in Wayne County	Dependent on the population density of the impacted area; you could use the benchmark figure as the minimum
Damage	6 homes destroyed; roads washed away; thousands of cars damaged; crops (squash, potatoes, corn, etc.) ruined	Dependent on impacted area; similar to damages that occurred during the benchmark; likely more intense and widespread damages
Other Impacts*		Water supply and quality issues; community isolation; human health (mold, insects, etc).
State of Emergency	Wolcott (Wayne County)	

**Economic loss can be considered; agricultural damages can be for multiple years following the disaster; could impact tourism.*

Damage (figures based on value of the dollar from the year of the event)

County	Property Damage ($)	Crop Damage ($)
Orleans County	200K	500K
Monroe County	500K	0
Wayne County	1.5M	200K
Cayuga County	300K	150K

Note: If a benchmark has state of emergency, assume that will happen for Credible Worst-Case Scenario.

Benchmark: May 13–14, 2014

Location: Seneca and Yates counties

Benchmark Conditions: Several weather factors came together that resulted in 4–5 inches of rain in less than 2 hours, devastating parts of Penn Yan, New York, and nearby areas. This rainfall total has a one percent probability of occurring in a given year, making this a 100-year rainfall event.

Credible Worst-Case Scenario Conditions: A 500-year event would result in 10 inches of rain over 3-6 hours. Islip, NY experienced 9 inches of rain over 2 hours in 2014.

Several clusters of thunderstorms moved across the Finger Lakes region from May 13–14, 2014. A narrow band of 4 to 5 inches of rain occurred in less than 2-hours over the central portion of Yates and Seneca counties. Rainfall resulted in devastating **flash flooding** in Penn Yan, NY that destroyed roads and buildings. Total public damages are estimated between 10 and 12 million dollars. The following impacts are from the National Oceanic and Atmospheric Administration/National Weather Service's Storm Event Database:

Throughout Yates County, creeks overtopped their banks, homes flooded, and roads were washed out or impassable. Water rescues took place around Italy, NY and Keuka Park, including one motorist that was trapped in their vehicle. In Penn Yan, catastrophic flash flooding occurred in the downtown area of the Village. The hardest hit areas were in the vicinity of Elm Street and Champlin Avenue where roads buckled, parking lots caved in, and the Owl's Nest Community Center collapsed. Tractor-trailer container boxes were seen floating down the streets, where they collided into the Wagner Restaurant causing significant structural damage. The foundations of several homes were washed away during the flood.

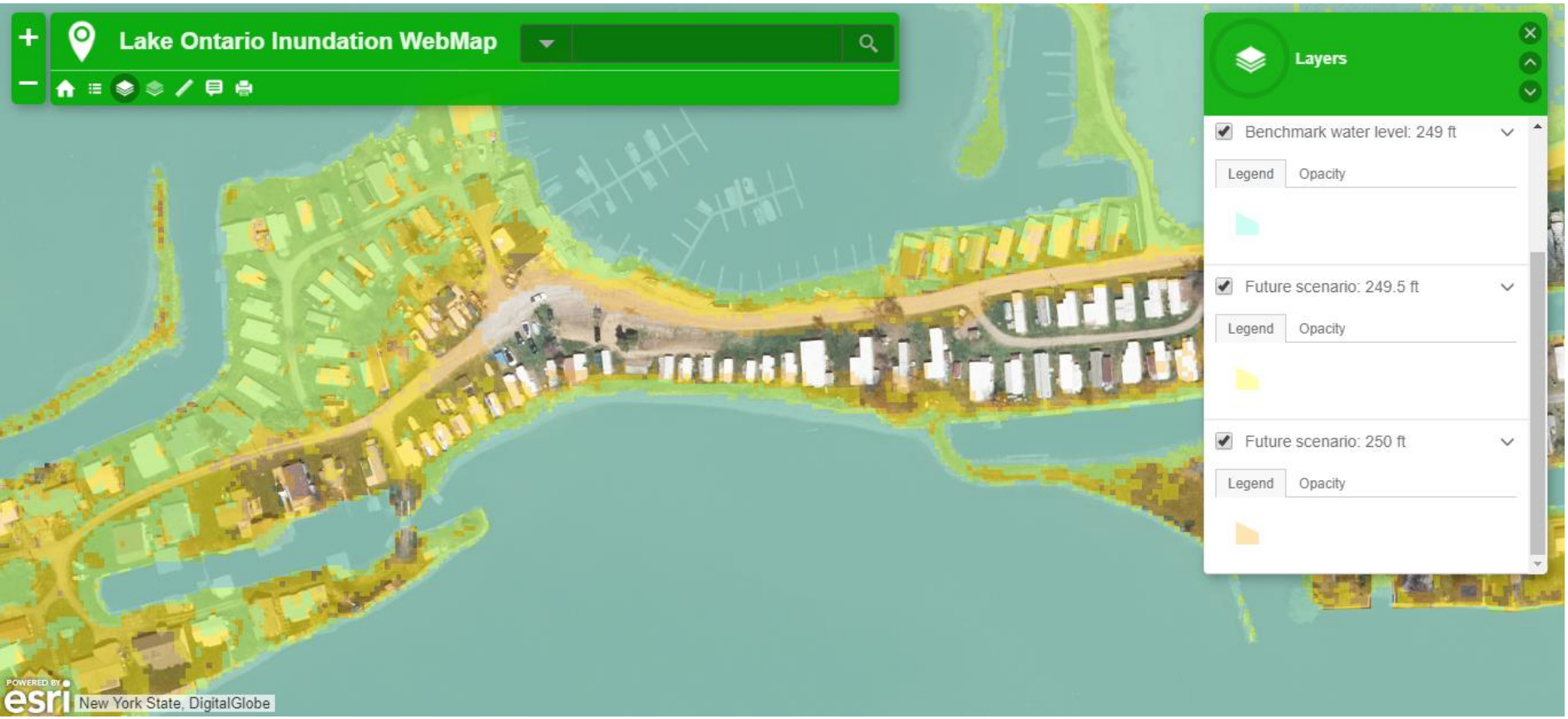
A ***flash flood*** is a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam).

East Valley Road, north of Branchport, NY. Floodwaters were beyond the capacity of existing ditches and culverts. Many area roads were damaged from the velocity and volume of the floodwater. Photo: Courtesy of Dave Enty (NWS Binghamton).

As floodwater travels across the land, it picks up debris. This house was nearly surrounded by debris that was left from receding floodwater. Photo: Mary Austerman, New York Sea Grant.

Floodwaters carry sediments as well. After the floodwaters receded, dirt, silt, and rocks covered much of this lawn. Photo: Mary Austerman, New York Sea Grant.

Lake Ontario Inundation Mapping Tool: *Coastal Flood Risk*



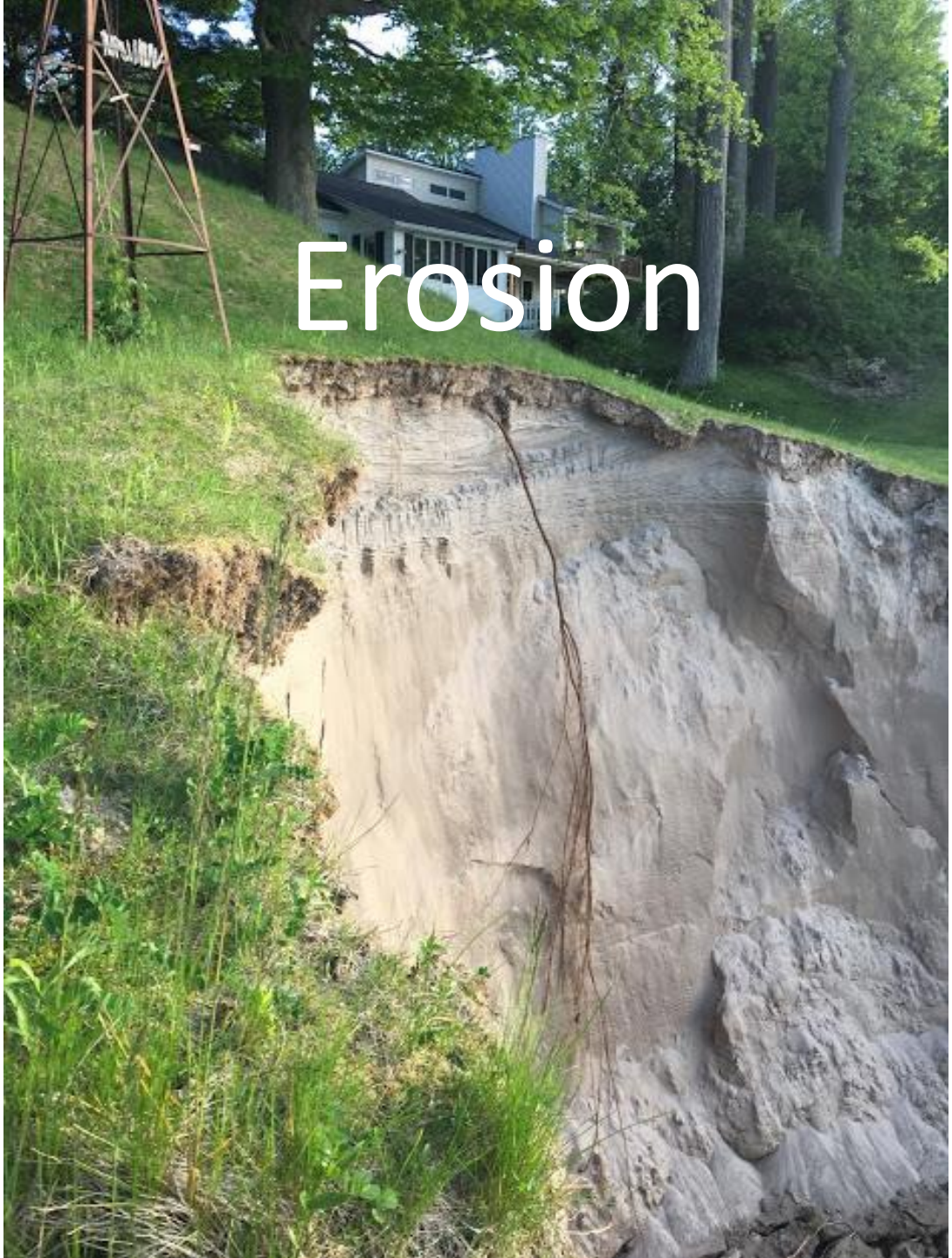
http://ccegeomaps.maps.arcgis.com/home/item.html?id=e58acb1db2a24a21b9e5fe1d069a7a63

2017 Lake Ontario Record-High Water Level Impact Survey

Flood survey story map:
https://ccegeomaps.maps.arcgis.com/apps/Cascade/index.html?appid=76d4abac6f2d4cf5811bb18a6e119a6e


Inundation

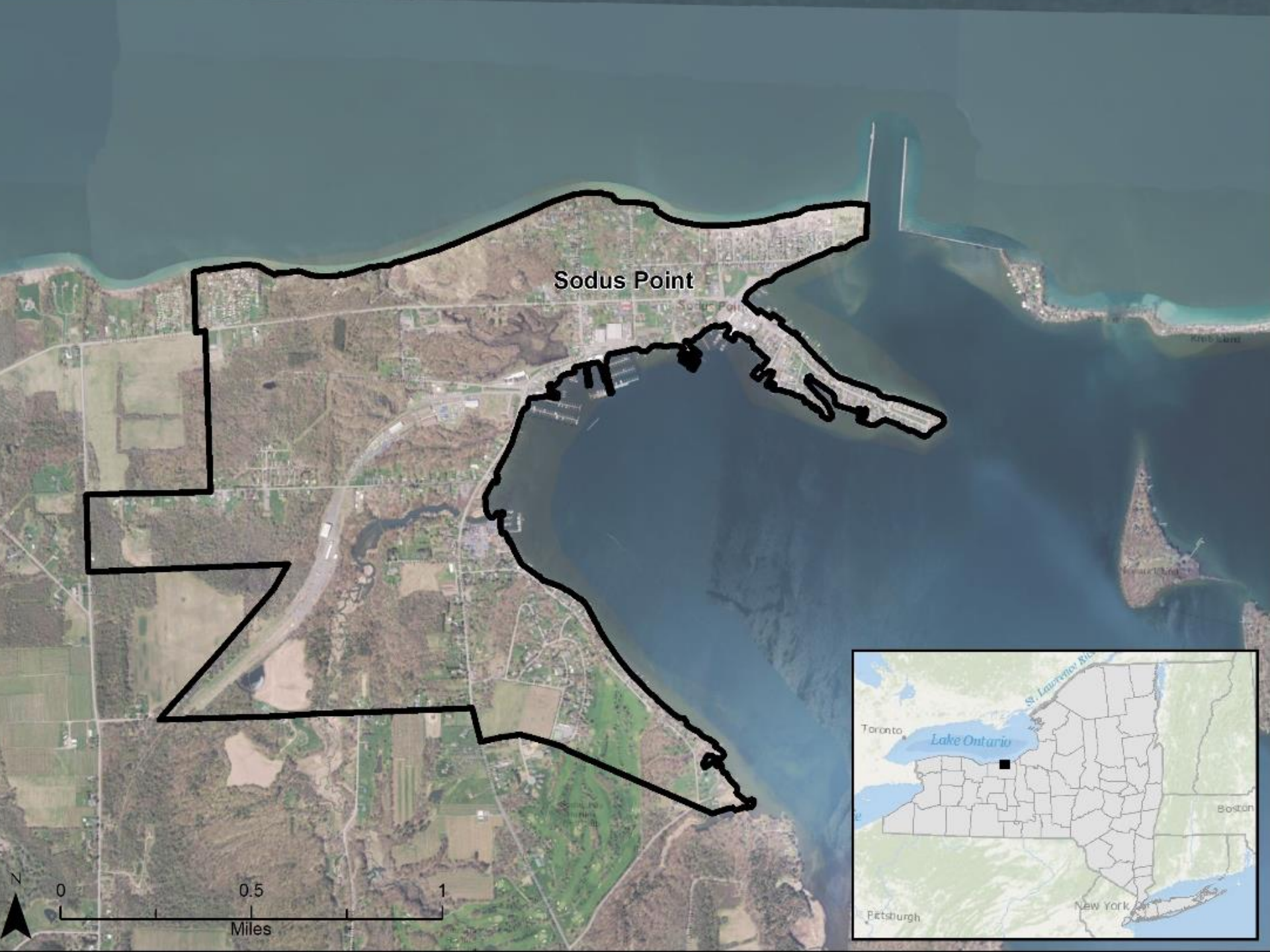

Damage to Homes


Erosion

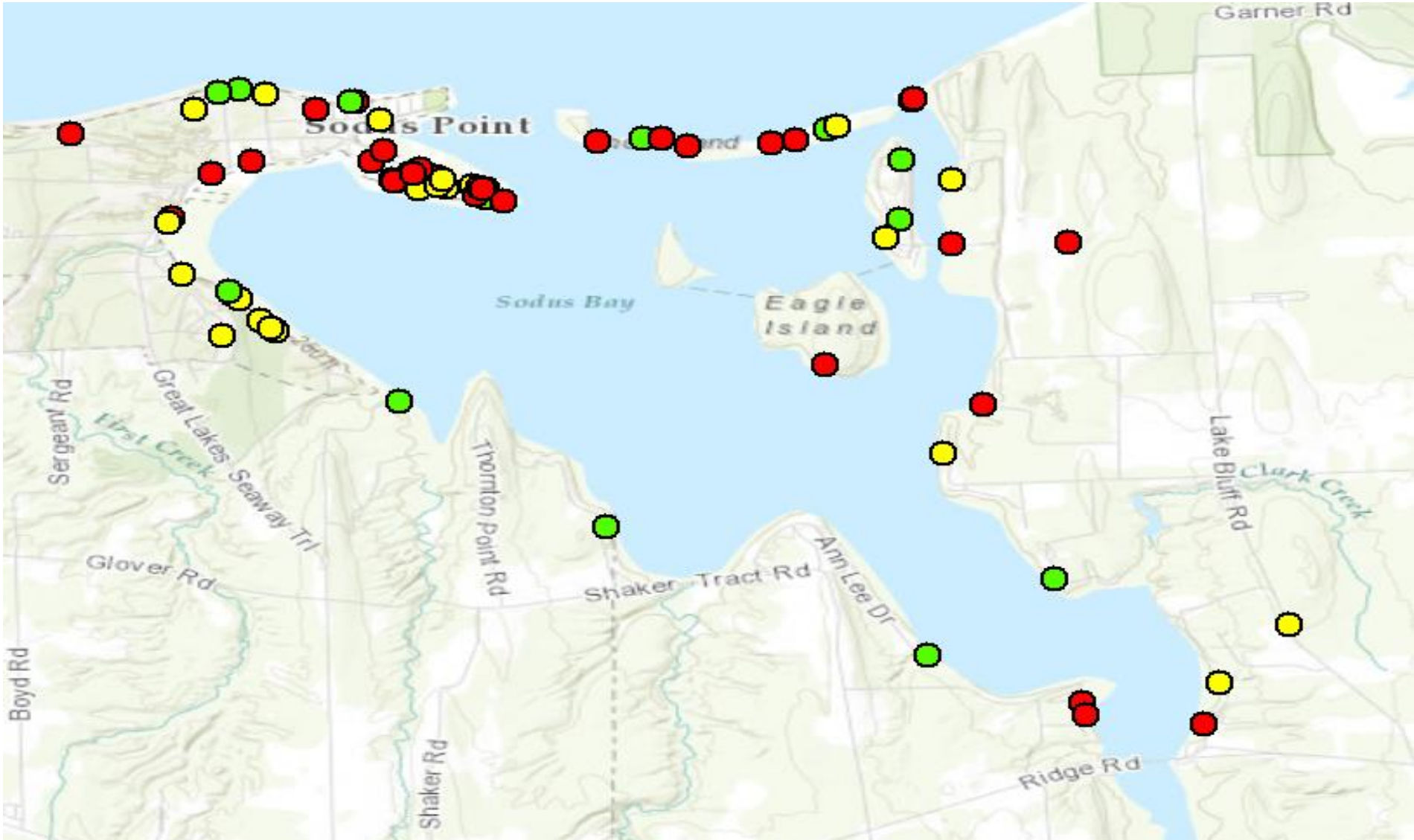
Shoreline Management Structure Damage

Case Study:

Post Flood Recovery Visioning with the Village of Sodus Point, NY


Sodus Point
N
0
0.5
1
Miles
Toronto
Lake Ontario
Boston
Pittsburgh
New York

Overall Impact
Sodus Bay, Wayne County

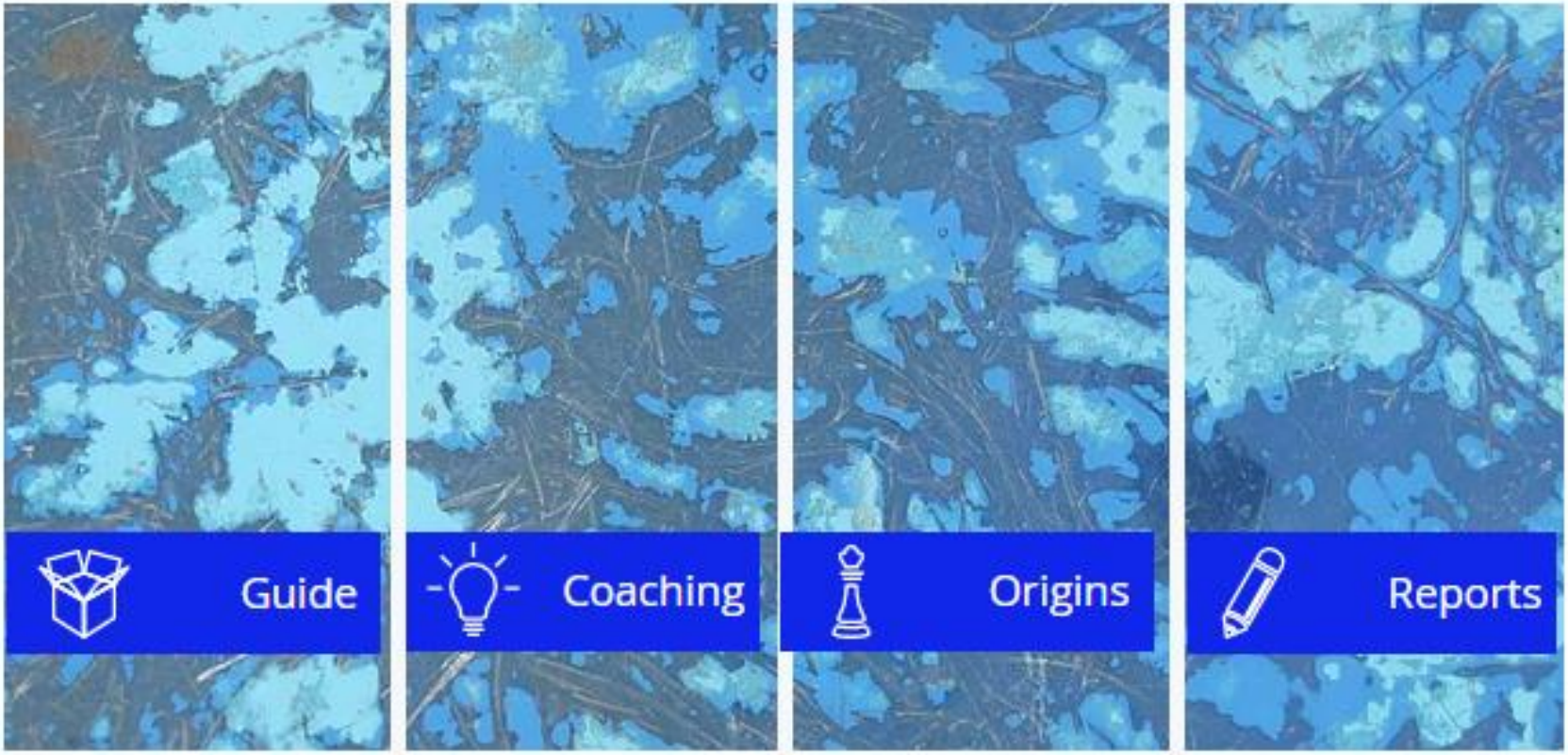


Critical Infrastructure and Facilities	Benchmark	Credible Worst-Case Scenario 1	Credible Worst-Case Scenario 2	Infrastructure/ facility functions after disaster*
Water Level (feet):	*249*	*249.5*	*250*	
Weather Disaster (list):				
Example: Power grid	✓			✓
Section B: Critical Facilities*				
Municipal Hall				
Municipal Department of Public Works				
Critical record storage				
Other government building(s) (list):				
Fuel (i.e., diesel, gas) stations for disaster response operations				
Police station or other law enforcement building(s)				
Jail				
Fire station(s)/Emergency Medical Service				
Communications main office or substations				
Emergency operation center				
Access to areas suitable for disaster response staging				
Access to points of distribution (staging areas for necessities for residents)				
Evacuation shelter(s)				
Hospital(s)				
Vulnerable populations (i.e., mobility impaired, daycare, group homes, people likely to refuse mandatory evacuation, etc.)				

Critical Facilities	Benchmark	Credible Worst Case Scenario	Infrastructure or facility functions after disaster	Notes:
Water level (feet)	*249'*	*249.5'*		
Example: power grid	*x*		*x*	
Section B: Critical Facilities*				
Municipal Hall			x	
Municipal Department of Public Works			x	
Critical record storage	x	x		
Other government building(s) (list):			x	
Policy station or other law enforcement building(s)			x	
Fire station(s)			x	
Communications (phone, Internet, etc.) main office or substations	x	x		This is a need; during the event: Sat AM meetings; 2 meetings/day; website and e-blasts
Emergency operation center			x	Highway barn; County OEM; Sherrif substation (on-site)
Evacuation shelter(s)			x	High school gym
Hospital(s)			x	
Vulnerable populations (i.e. daycares, group homes, etc.)			x	Village doesn't know of any; sand bagging is an issue because of aging population and seasonal homes (need legislature that gives the Village the ability to do it
Hazardous materials facilities (gas stations, marinas with fuel or other hazard materials, etc.)	x	x		Marinas
Abandoned, deteriorated, or underused sites and buildings	x	x		All mapped by the Village (2 commercial; 3 residential); hoping they are demolished in fall 2018
Total check marks for Section B:		**2**	**9**	

Community Resilience Building

Get on the right path to resilience today...



Community Resilience Building is a unique, "anywhere at any scale", community-driven process, rich with information, experience, and dialogue, where participants identify top hazards, current challenges, strengths, and priority actions to improve community resilience to all hazards today, and in the future.

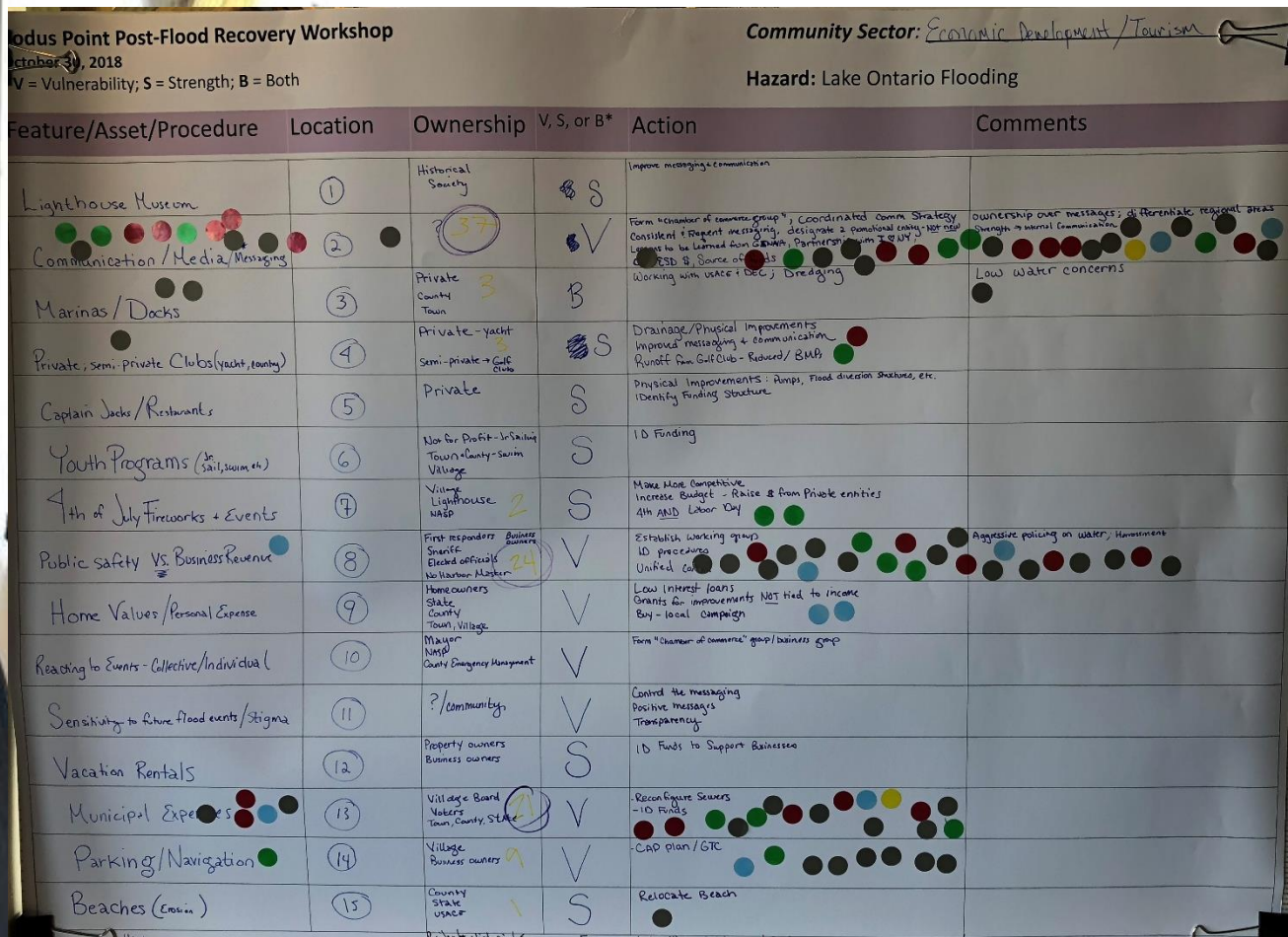
www.CommunityResilienceBuilding.org

...follow the action on

Visioning Workshop:
setting the stage

Visioning Workshop:
breakout groups

Prioritization of actions



odus Point Post-Flood Recovery Workshop
ctober 31, 2018
V = Vulnerability; S = Strength; B = Both

Community Sector: Economic Development / Tourism

Hazard: Lake Ontario Flooding

Feature/Asset/Procedure	Location	Ownership	V, S, or B*	Action	Comments
Lighthouse Museum	1	Historical Society	S	Improve messaging + communication	
Communication / Media / Messaging	2	37	V	Form "chamber of commerce group", Coordinated Comm Strategy Consistent + frequent messaging, designate 2 promotional entity - NOT new Lessons to be learned from GLOWA, Partnership with IJC/UVP, CESD & Source of funds	ownership over messages; differentiate, regional areas Strength → Internal Communication
Marinas / Docks	3	Private, County, Town 3	B	Working with USACE + DEC; Dredging	Low water concerns
Private, semi-private Clubs (yacht, country)	4	Private - Yacht; Semi-private → Golf Clubs	S	Drainage/Physical Improvements Improved messaging + communication Runoff from Golf Club - Reduced / BMPs	
Captain Jacks / Restaurants	5	Private	S	Physical Improvements: Pumps, Flood diversion structures, etc. Identify Funding Structure	
Youth Programs (Jr. Sail, swim, etc)	6	Not for Profit - Jr Sailing Town + County - Swim Village	S	ID Funding	
4th of July Fireworks + Events	7	Village, Lighthouse, NASP 2	S	Make More Competitive Increase Budget - Raise $ from Private entities 4th AND Labor Day	
Public safety VS. Business Revenue	8	First responders, Business owners, Sheriff, Elected officials, No Harbor Master 24	V	Establish working group ID procedures Unified Co	Aggressive policing on water / Harassment
Home Values / Personal Expense	9	Home owners, State, County, Town, Village	V	Low interest loans Grants for improvements NOT tied to income Buy - local campaign	
Reacting to Events - Collective/Individual	10	Mayor, NMP, County Emergency Management	V	Form "Chamber of commerce" group / business group	
Sensitivity to future flood events / Stigma	11	? / Community	V	Control the messaging Positive messages Transparency	
Vacation Rentals	12	Property owners, Business owners	S	ID Funds to Support Businesses	
Municipal Expenses	13	Village Board, Voters, Town, County, State 21	V	Reconfigure Sewers - ID Funds	
Parking / Navigation	14	Village, Business owners 9	V	CAP plan / GTC	
Beaches (Erosion)	15	County, State, USACE 1	S	Relocate Beach	

Resiliency Actions:
Communication strategy

Outreach Action – #1	**Develop a formal local marketing and communications strategy.**
Lead Department	Village of Sodus Point
Partners	Christopher Communications
Cost	Medium
Funding Sources	Village Budget
Narrative	Christopher Communications has been hired to create a communications approach that relays credible, timely information to business owners and craft ready-to-use messaging to be disseminated by key Village representatives and community partners.
Implementation Schedule	Current (as of August 2019)

Shoreline Management Action – #1	Seek Coastal Erosion Hazard Area (CEHA) designation.
Lead Department	Village of Sodus Point
Partners	G/FLRPC, NYSG
Cost	Medium
Funding Sources	Grant Funding
Narrative	G/FLRPC, along with NYSG and the lab at the Department of Biological and Environmental Engineering, Cornell University, submitted an application to the Great Lakes Research Consortium (GLRC) Small Grants Program 2019 RFP to investigate how the Coastal Erosion Management Permit Program is administered in select communities along the Lake Ontario shoreline within the Genesee-Finger Lakes Region. The proposal was not selected for funding. However, G/FLRPC and NYSG approached the National Sea Grant Law Center to provide research regarding the New York Coastal Erosion Hazard Area (CEHA) Permit Program. Monroe County Department of Planning & Development's Land Use Decision-Making Training Program is hosting training for Fall 2019 on *Managing Regulatory Challenges and Tools for Great Lakes Shorelines*.
Implementation Schedule	Not Active

Image: https://medium.com/re-write/retrospective-top-lessons-learned-during-first-semester-at-bdw-57a5d79f38f7

Lessons Learned

- Research
- Collaborate
- Integrate
- Customize
- Adapt
- Transfer

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