Weather Resilience: Tips for Improving Your Community's Ability to Respond to Severe Weather

View of Fulton Chain of Lakes, the headwaters of the Black River, from the summit of Rocky Mtn. Photo by Emily Sheridan.

Mary Austerman, Coastal Community Development Specialist
New York Sea Grant
Khris Dodson, Associate Director
Syracuse University Environmental Finance Center
Black River Watershed Conference
June 2, 2021

Environmental Finance Center
Syracuse University

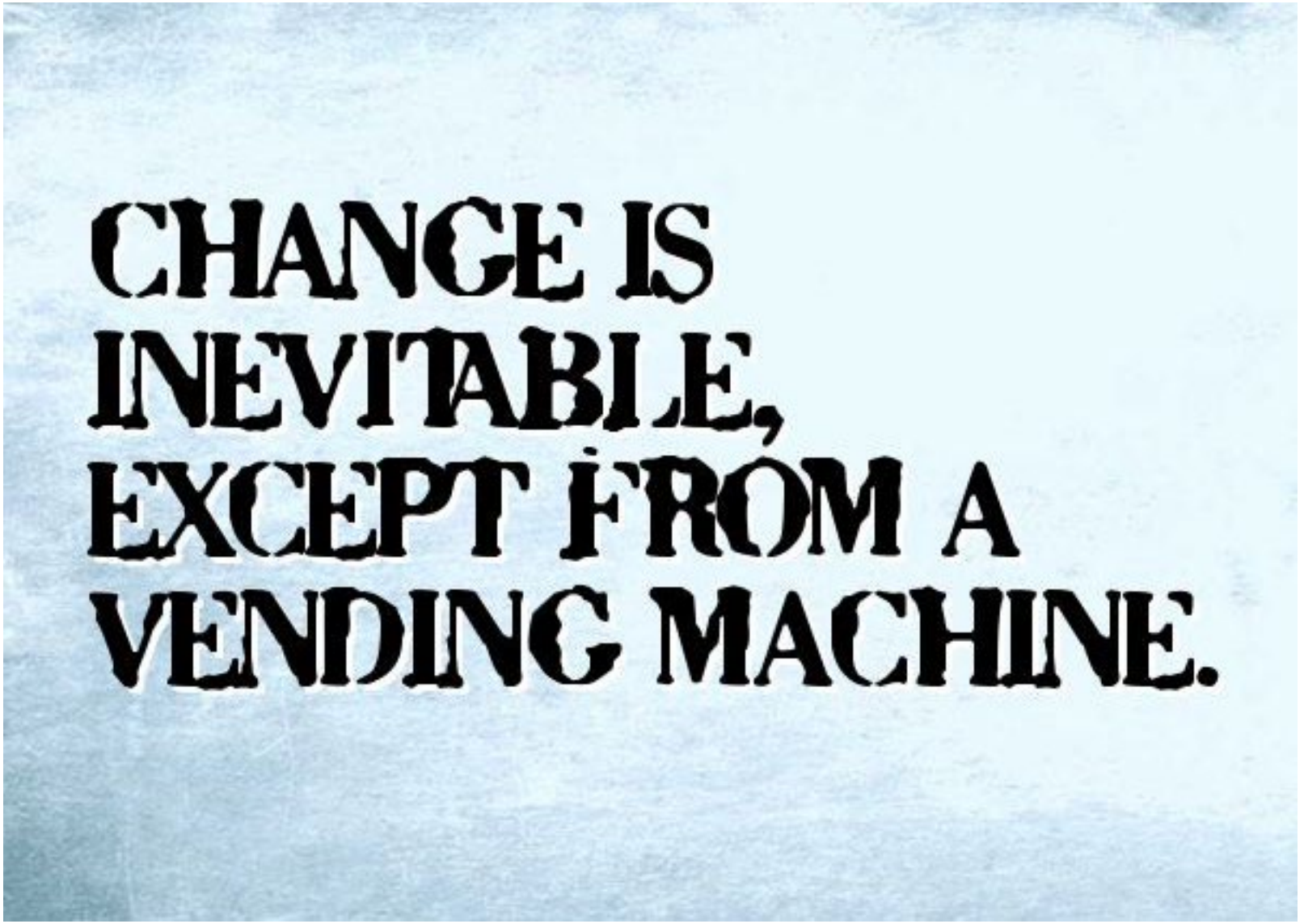
Sea Grant
New York

What is resiliency?

Resilience is the ability to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event planning to re-organize, change, and learn in response of a threat.

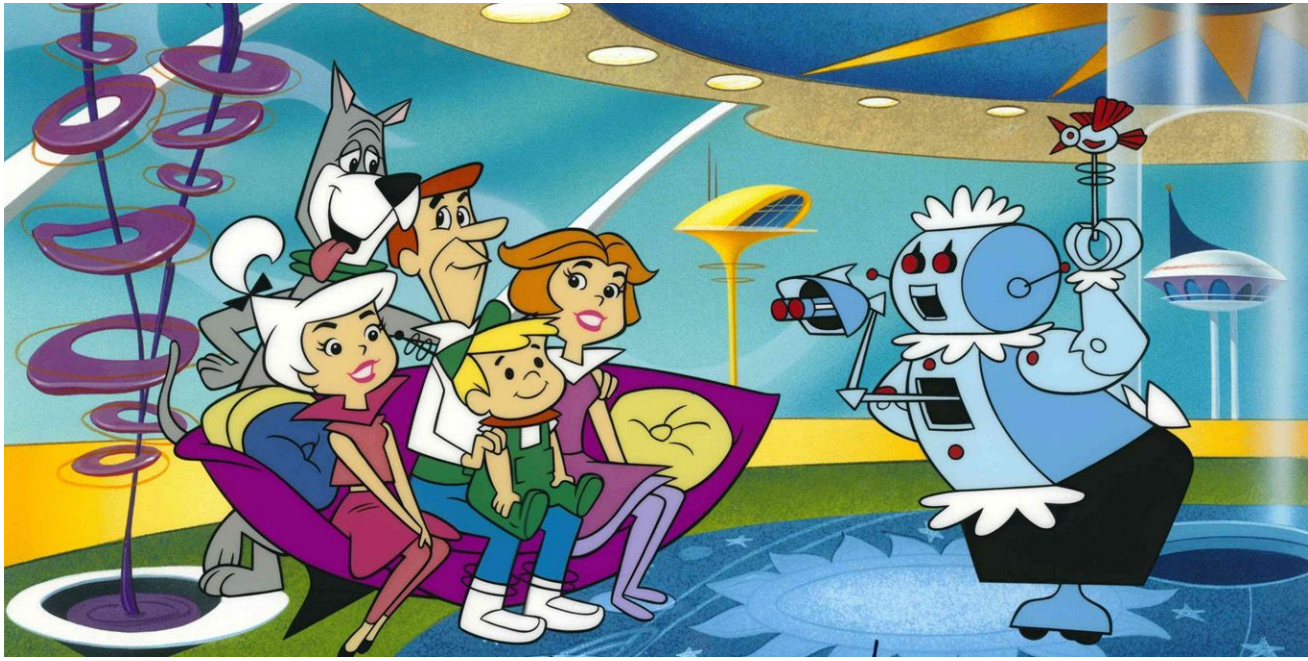
Do you talk about resilience in your day-to-day work life?

Proactive Planning vs. Reactive Resiliency Planning


CHANGE IS
INEVITABLE,
EXCEPT FROM A
VENDING MACHINE.

Stop and Think….

- What does your community look like today?
  - Landscape
  - Activities
  - Amenities
  - Demographic composition
- What will your community look like in 30 years?
- What do you want it to look like?
- Who will live there?
- What are past, present and future challenges and how do you plan for them?
- *What keeps you up at night?*

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NEW YORK & COMPANY
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Ice Cream
streetlalk
Perfume Galaxy

GRUBHUB™

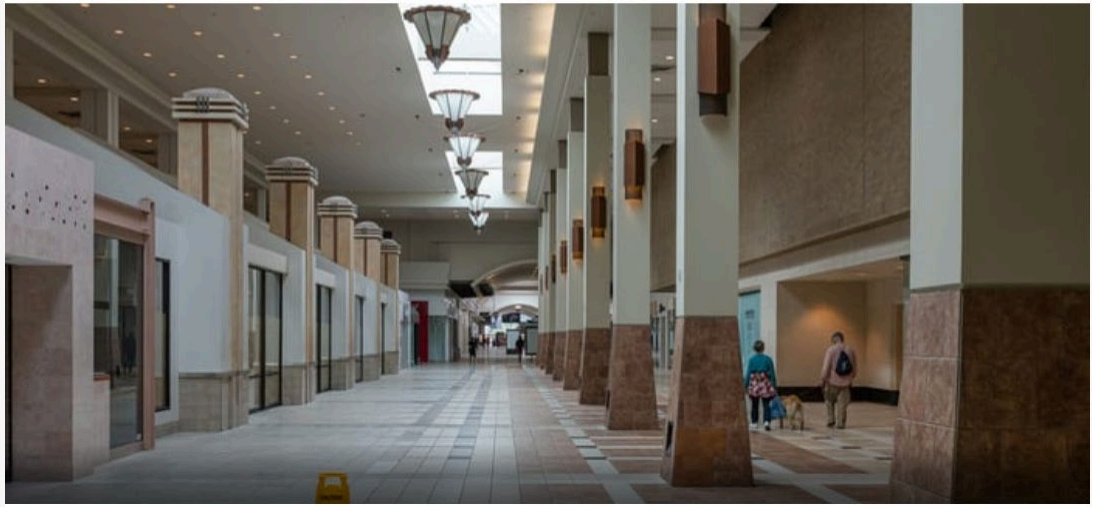
amazon Prime

RETAIL

Mall Vacancy Rate Reaches 20-Year High

By PYMNTS

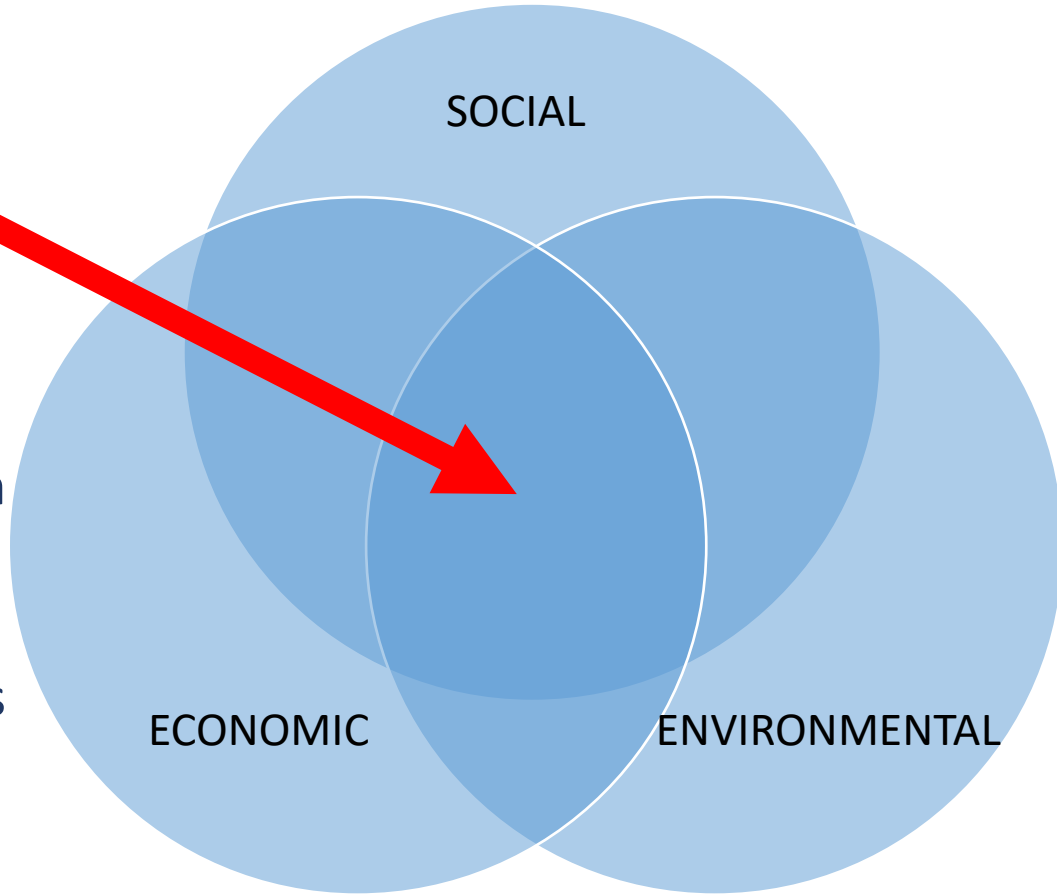
Posted on January 7, 2020



It's all inter-related

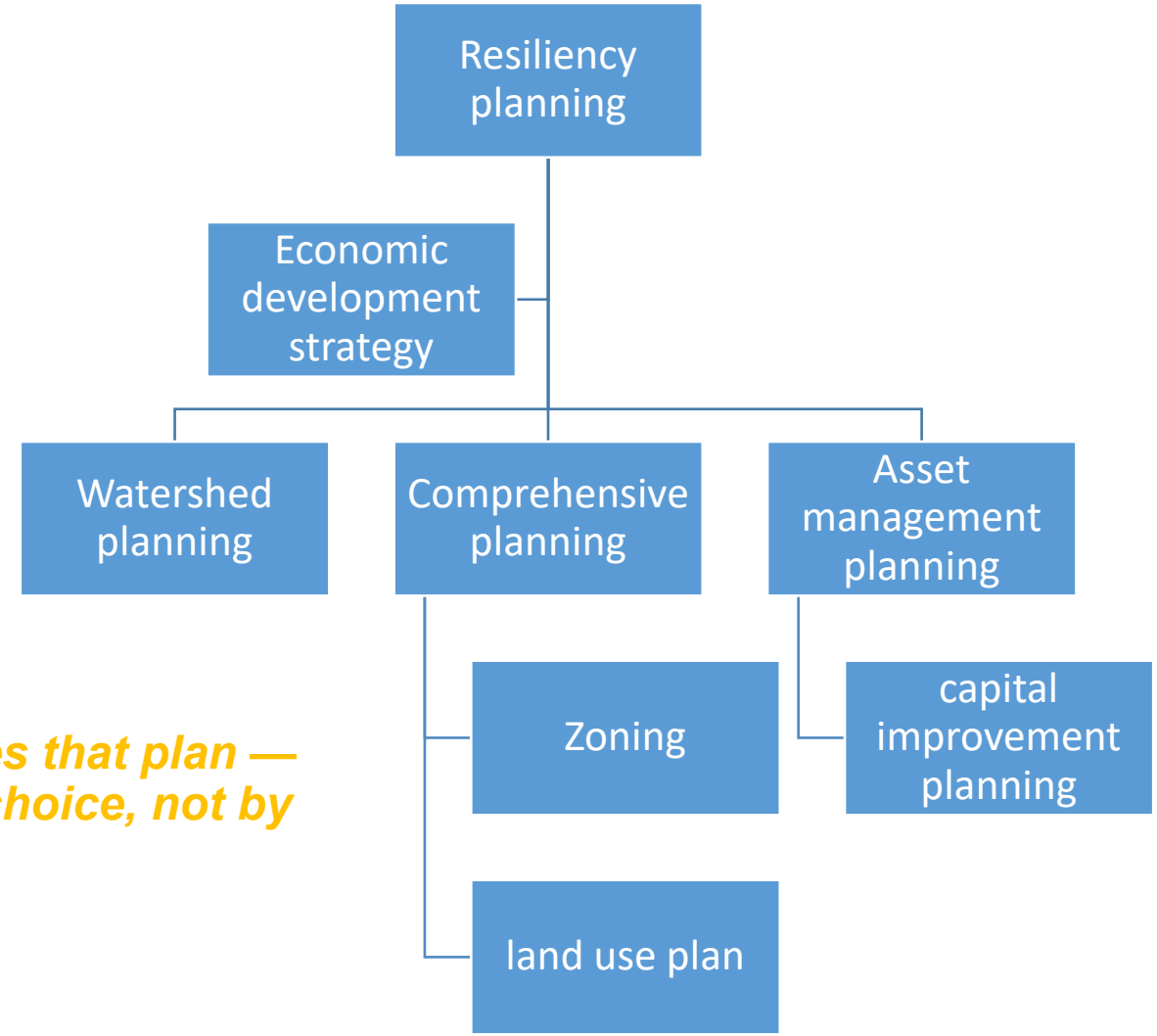
YOU ARE HERE!

- Community resilience
- Stormwater
- Agriculture
- Harmful Algal Blooms
- infrastructure
- Drinking water source protection
- Water resource management
- Transportation
- Septics and other nutrient inputs
- Planning
- Tourism
- AND, MORE!



Planning for Resiliency

- ✓ Comprehensive Plans
- ✓ Zoning
- ✓ Asset Management Planning
- ✓ Capital Improvement Planning
- ✓ Land-Use Planning
- ✓ Watershed Planning

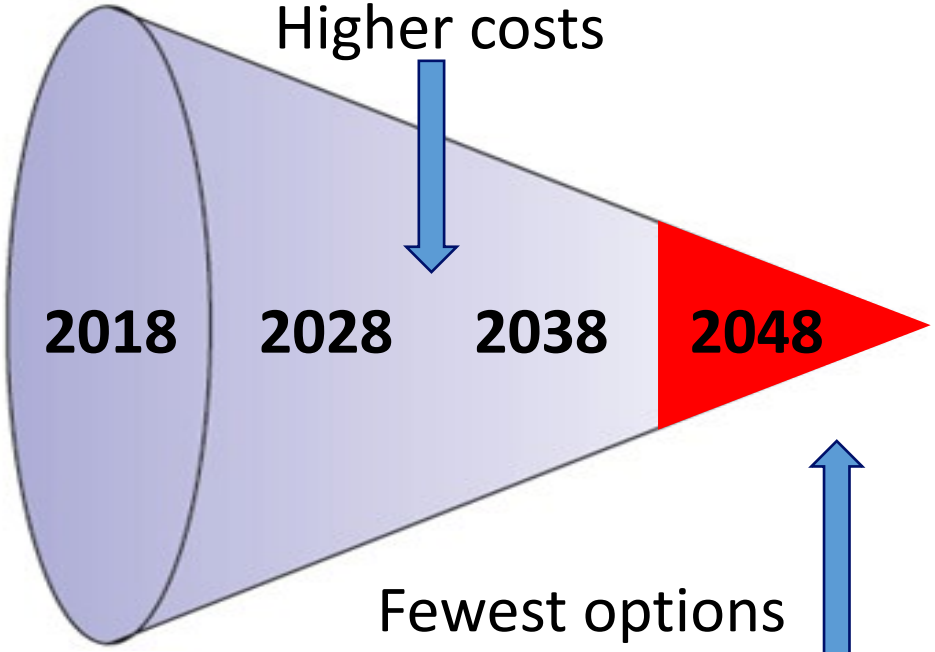


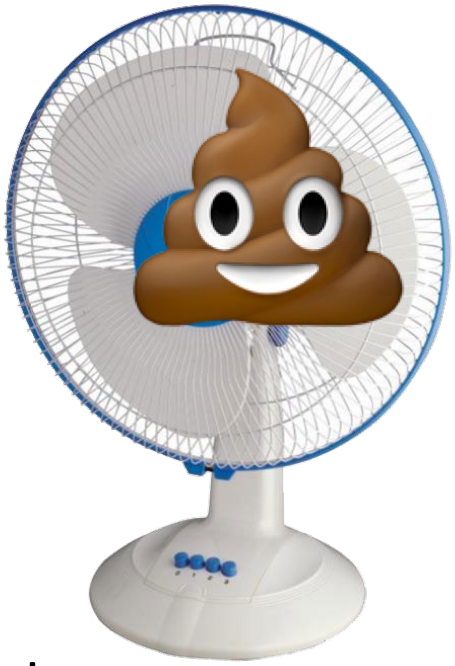
Communities that plan — change by choice, not by chance.

Waiting is Costly

Fewer options
Higher costs

Multiple options
Lower costs



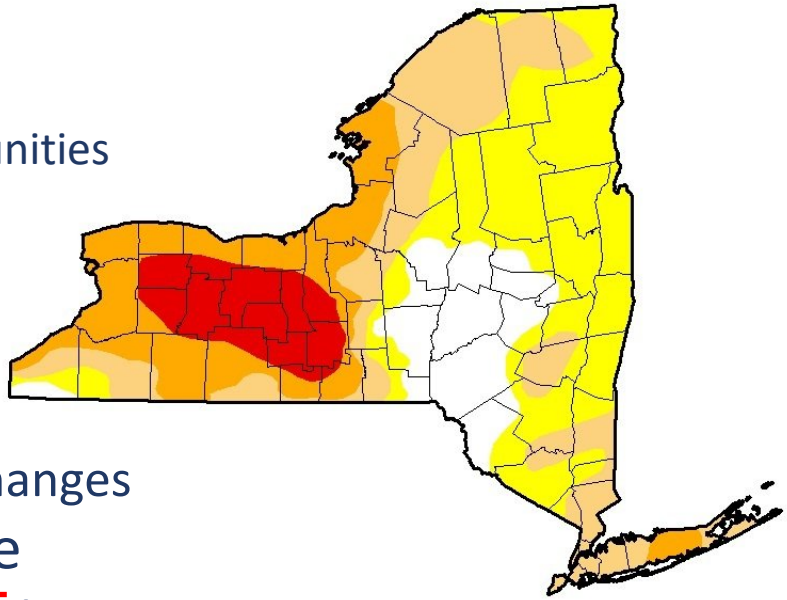


Fewest options
Highest costs
Including damage and recovery costs

Resiliency Considerations

Community resiliency can include:

- Municipal financial health
- Community financial health
  - Is your portfolio diversified? Consider:
    - community demographics
    - Commerce
    - relation to neighboring communities
- Environment:
  - water supply,
  - impacts from storms,
  - drought,
  - social, cultural, and economic changes
- Adaptation to {Climate} Change
- Social, cultural, and economic changes



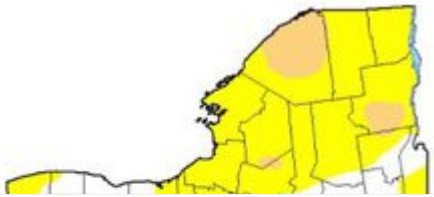
What do you consider as the greatest weather threat to your community:

- Flood
- Drought
- Wind
- More frequent storms
- More severe storms

What threats does my community need to prepare for?

- Climate Change/weather trends
  - Changing precipitation patterns
  - Rising temperatures
  - Habitat shifts
  - Impacts: natural & built environments
  - Impacts: human health

Drought



NEWS

Drought leaves Lewis County residents having to haul water to their homes

WWNY Drought leaves Lewis County residents having to haul water to their homes

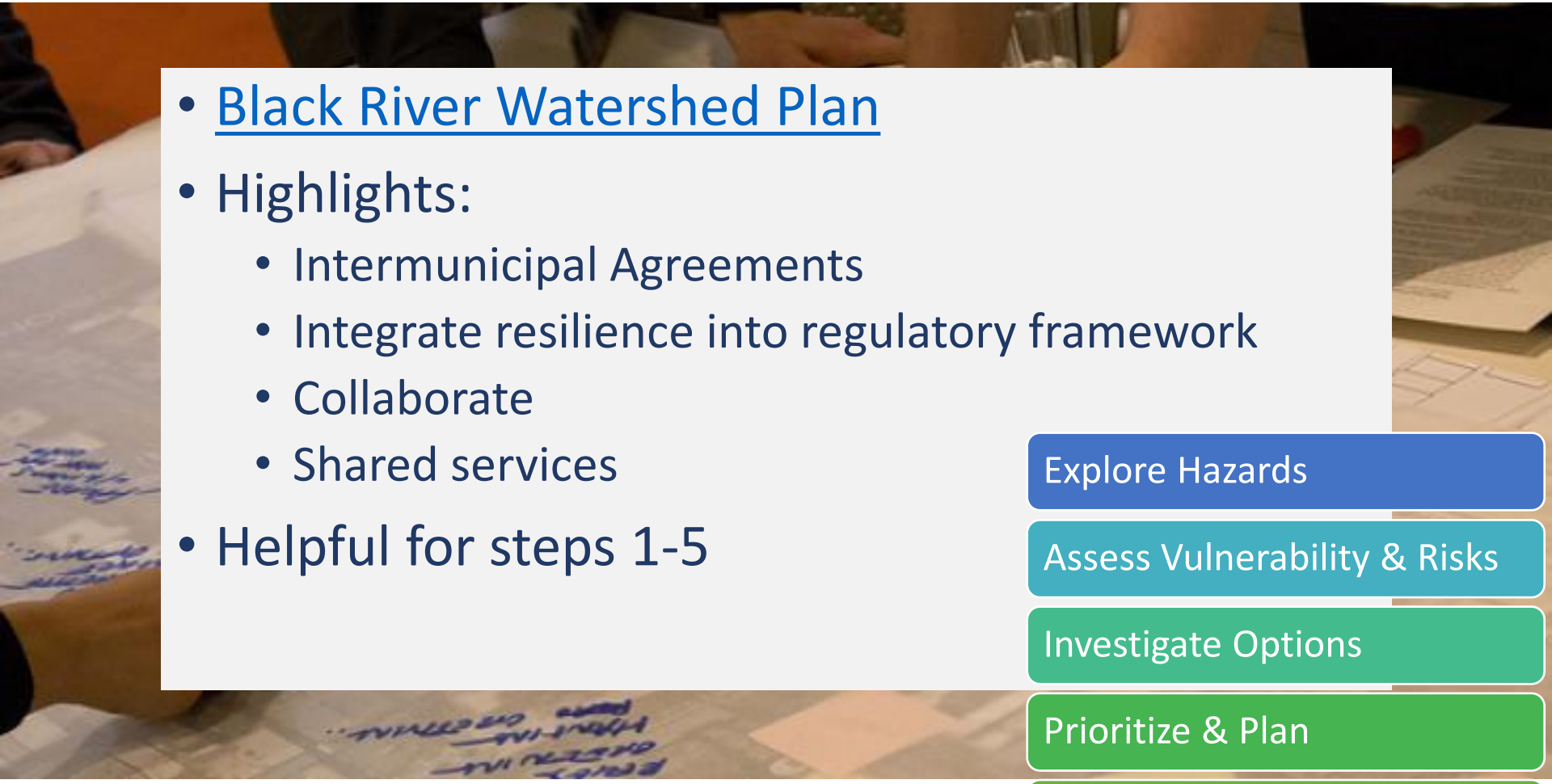
https://www.ucsusa.org/resources/drought-and-climate-change

https://www.wwnytv.com/2019/11/03/sunday-after-rain-wind-flood-stage-along-black-river/

Tools for Weather Resilient Communities


Explore Hazards
Assess Vulnerabilities & Risks
Investigate Options
Prioritize & Plan
Take Action

Community Planning



- Black River Watershed Plan
- Highlights:
  - Intermunicipal Agreements
  - Integrate resilience into regulatory framework
  - Collaborate
  - Shared services
- Helpful for steps 1-5

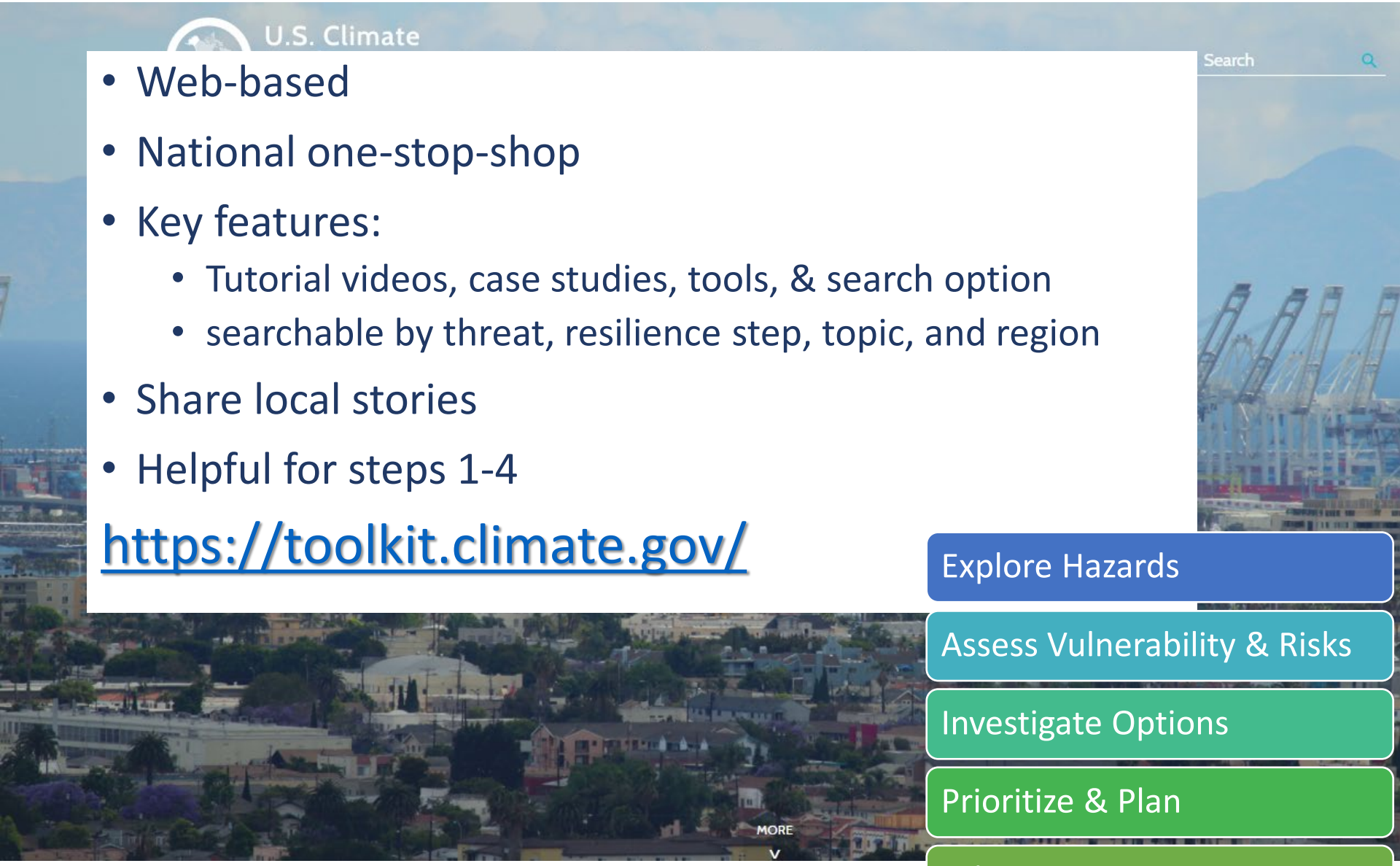
Explore Hazards

Assess Vulnerability & Risks

Investigate Options

Prioritize & Plan

Take Action



- Web-based
- National one-stop-shop
- Key features:
  - Tutorial videos, case studies, tools, & search option
  - searchable by threat, resilience step, topic, and region
- Share local stories
- Helpful for steps 1-4

https://toolkit.climate.gov/

Explore Hazards

Assess Vulnerability & Risks

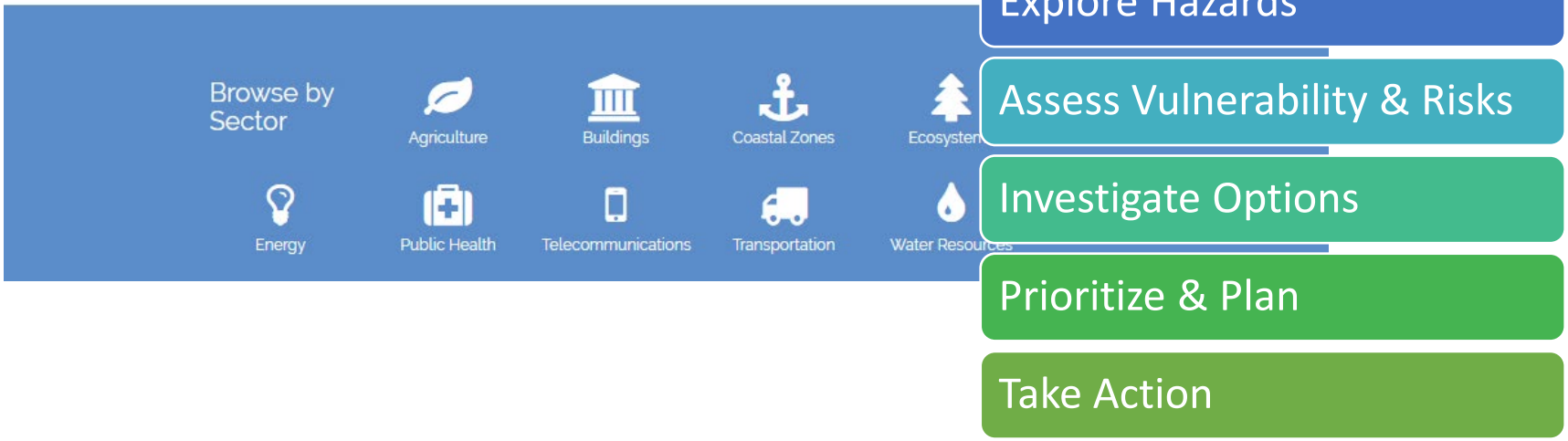
Investigate Options

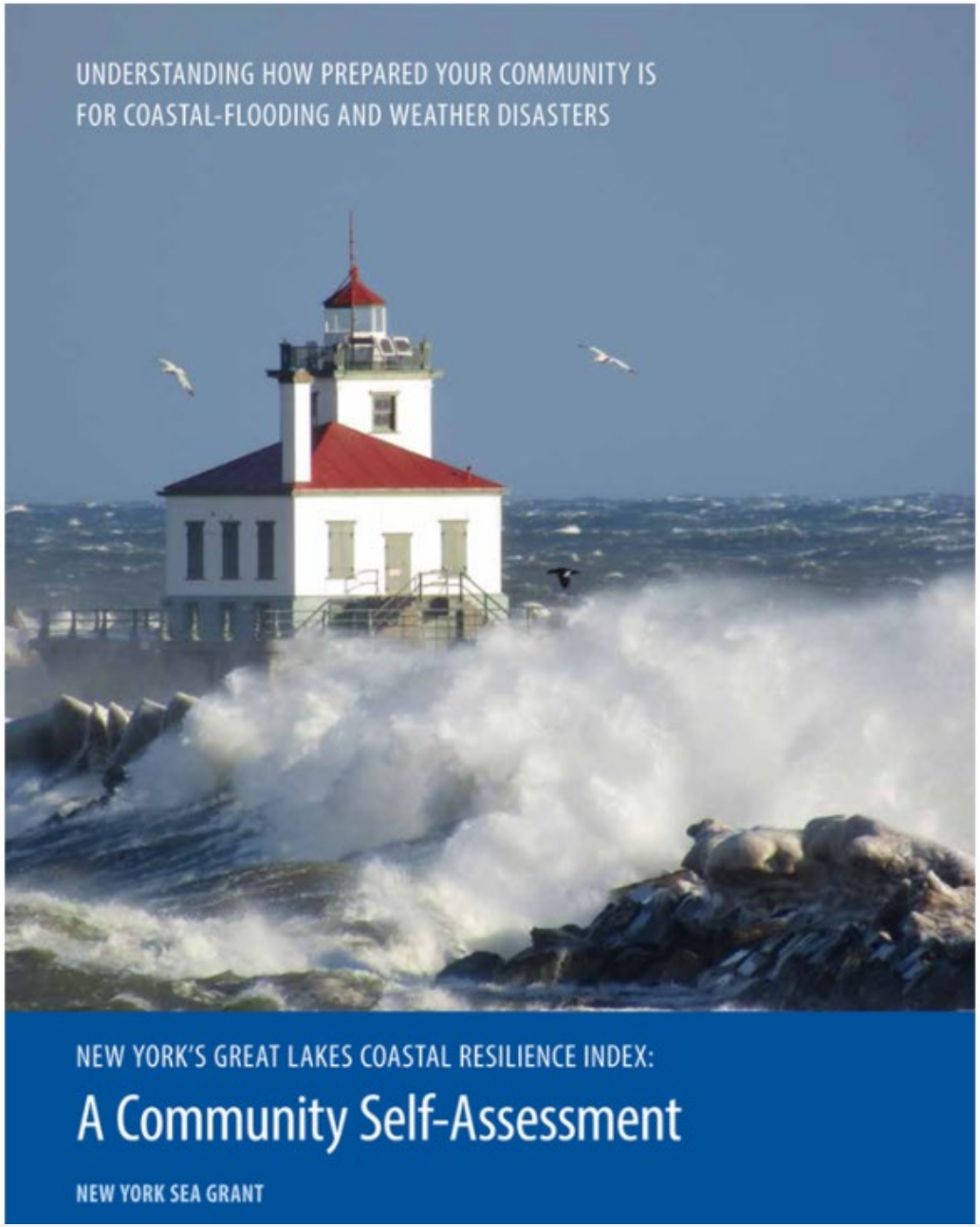
Prioritize & Plan

Take Action

- Web-based
- New York
- Provides climate science data, maps, tools, documents, and other relevant websites
- Discovery tools for the following NY sectors: agriculture, buildings, coastal zones, ecosystems, energy, public health, telecommunications, transportations and water resources
- Helpful for steps 1-4

https://www.nyclimatescience.org/





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

TABLE OF CONTENTS

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.)				

Section 1B: Critical Facilities

Total number of critical facilities functioning after a disaster: _____

Number of check marks	Percentage of critical facilities functioning during or after coastal flooding/after weather disaster	Resilience Index
0–5	0–27.5%	LOW
6–11	27.6–60.5%	MEDIUM
12–18	60.6–100%	HIGH

Your critical facilities **Resilience Index** is _____.

Find out what your Resilience Index means on page 17.

Interpreting Your Resilience Index Results

Ways to Customize the CRI

APPENDICES

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).

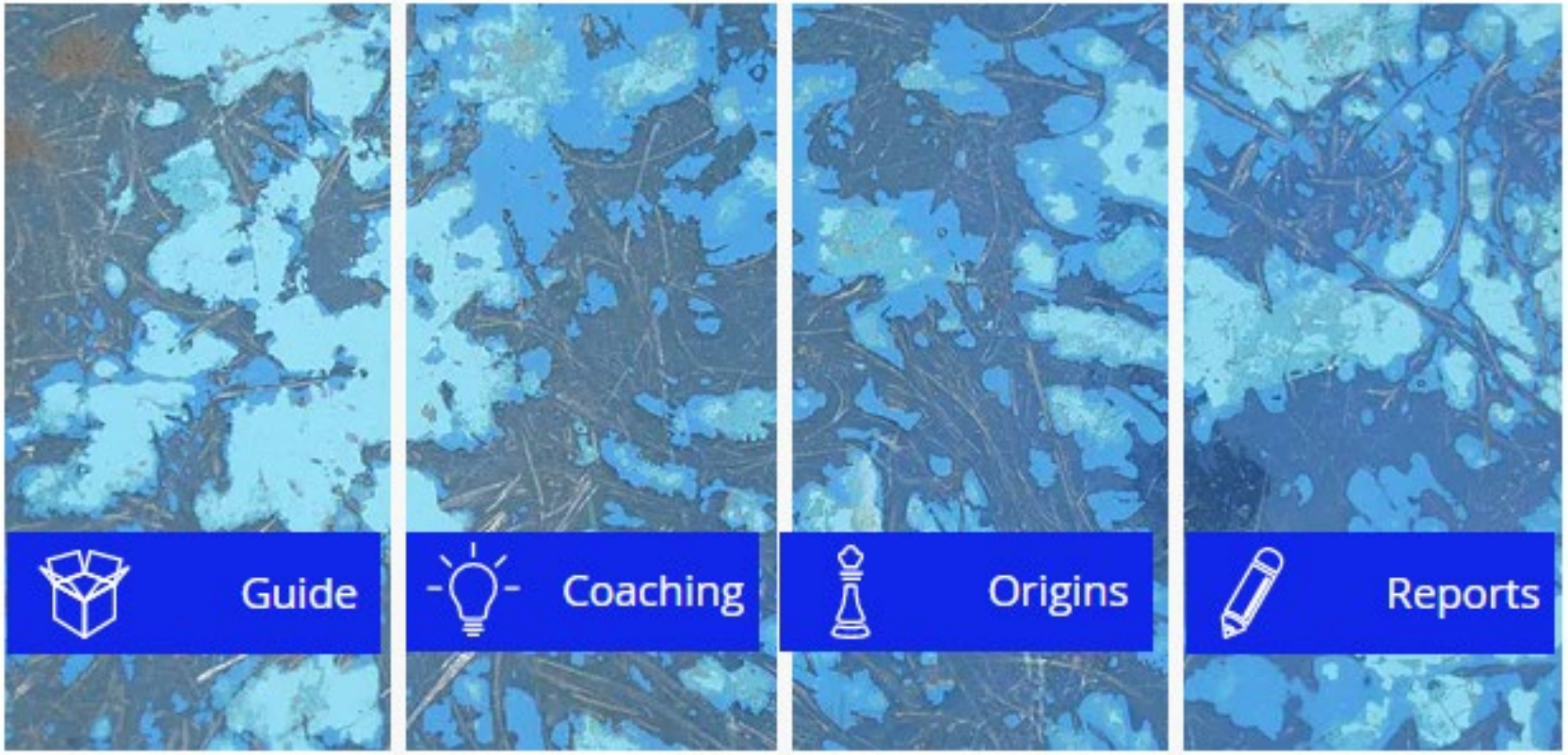
As floodwater travels across the land, it picks up debris. This house was nearly surrounded by debris that was left from receding floodwater. Photo: Mary Austerman, New York Sea Grant.

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.

Community Resilience Building

Home | Works | Origins | Contact

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

Case Studies

- What did they do?
- How did you do it?
- Who did it?
  - New partners?
- Where did it happen?
  - Don’t be discouraged!
- Transferability

Precise Soil, Climate, and Weather Data Help Dairy Optimize Water Use

For irrigated crops, knowing when and how much water to apply has long been a matter of experience and guesswork. In a changing climate, new technology can reduce this uncertainty, enabling farmers to make every drop of water count.

Read more ›

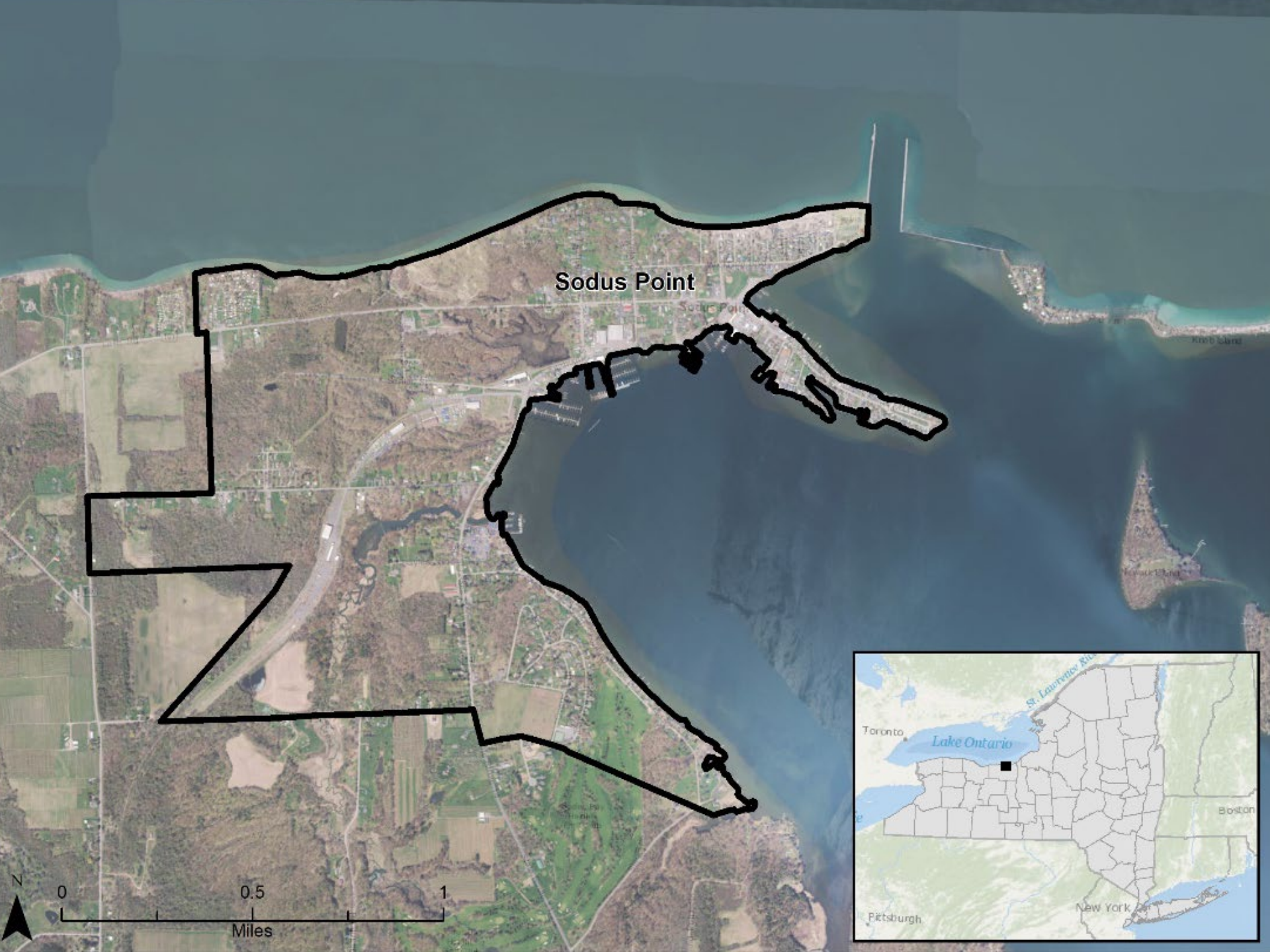
Local-ish examples

Black River

Images: Lewis County Soil & Water Conservation District

Case Study:

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


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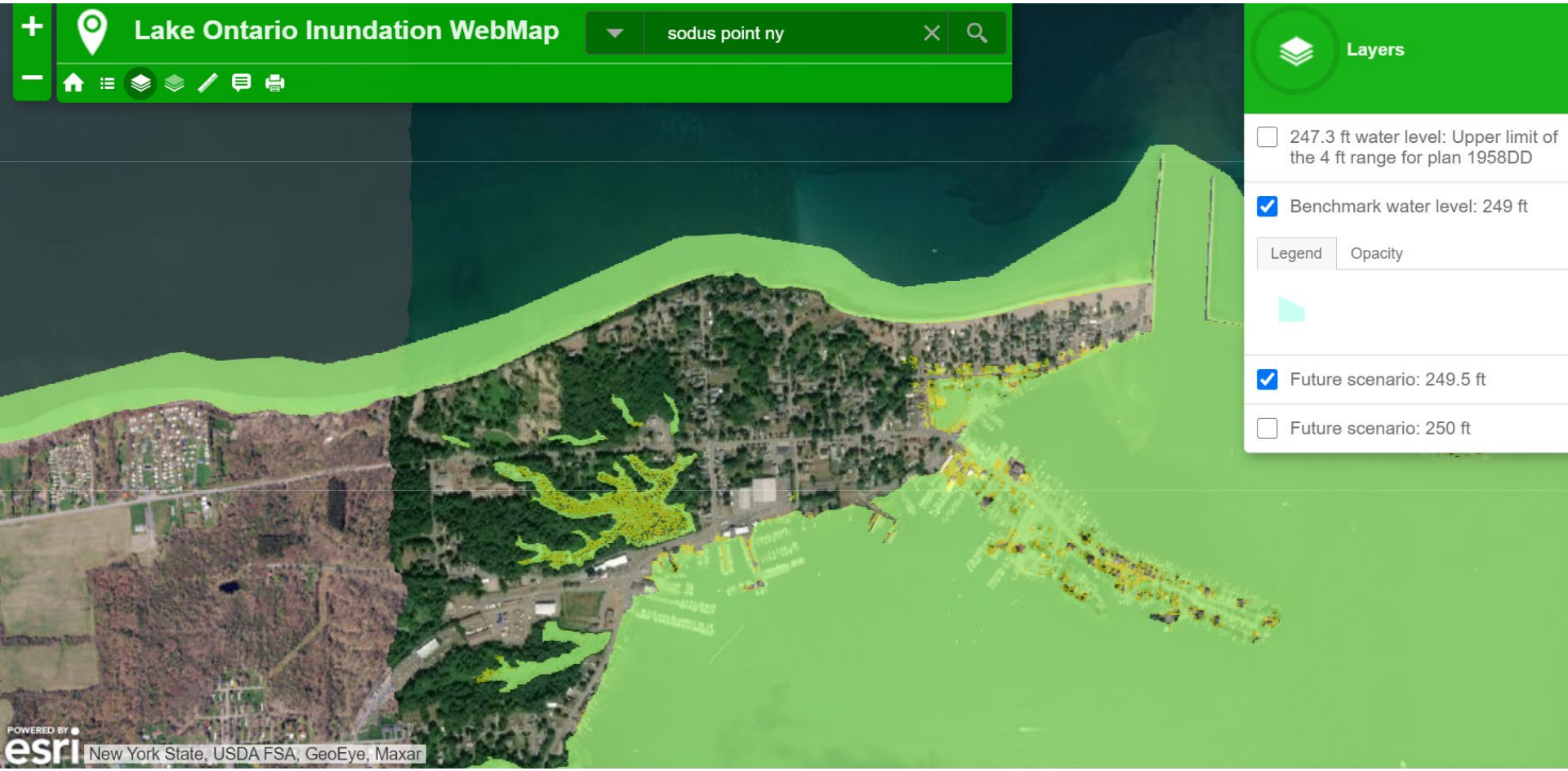
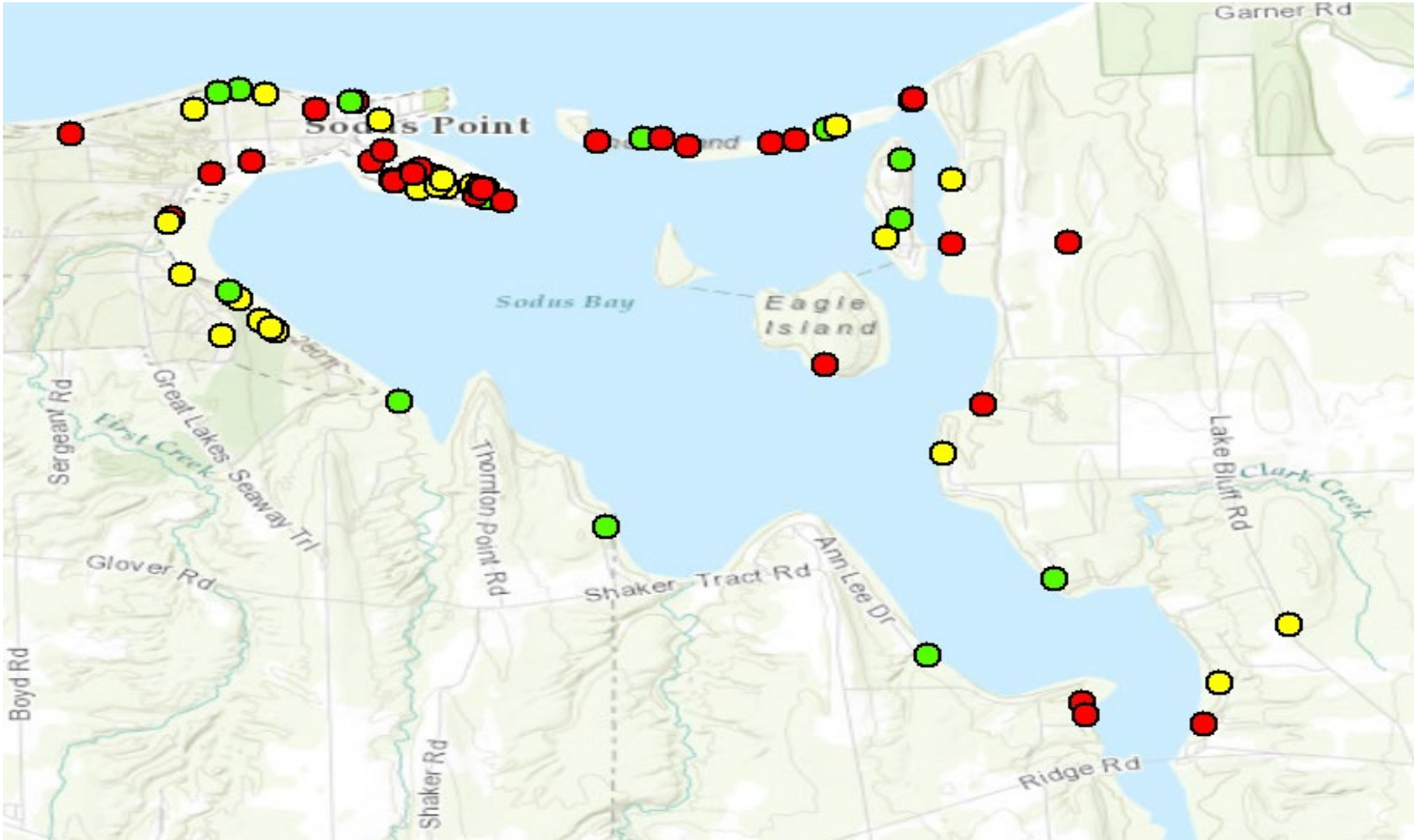
0.5
1
Miles
Toronto
Lake Ontario
Boston
Pittsburgh
New York

Flood Risk
Sodus Point, NY, Wayne County



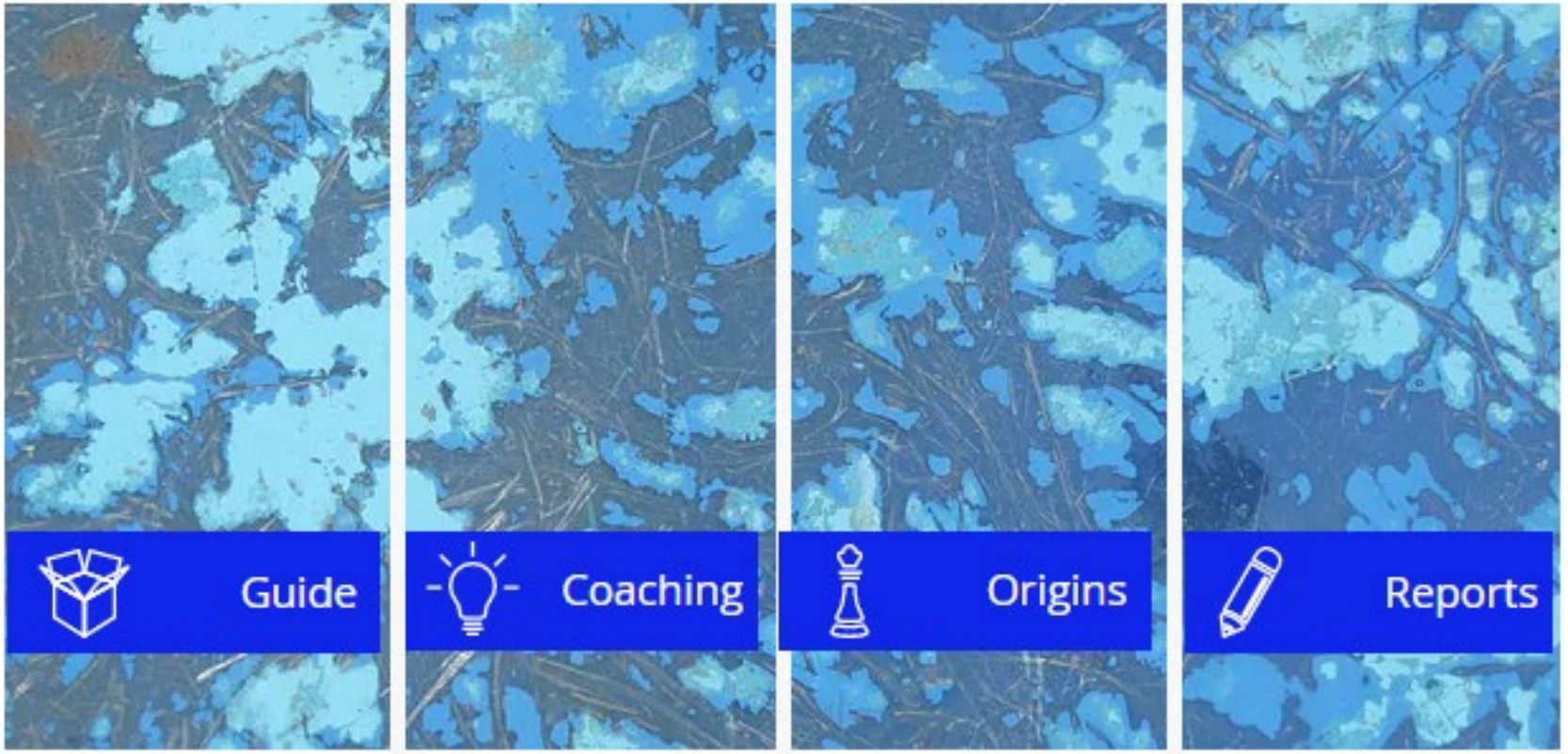
Overall Impact
Sodus Bay, Wayne County



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...



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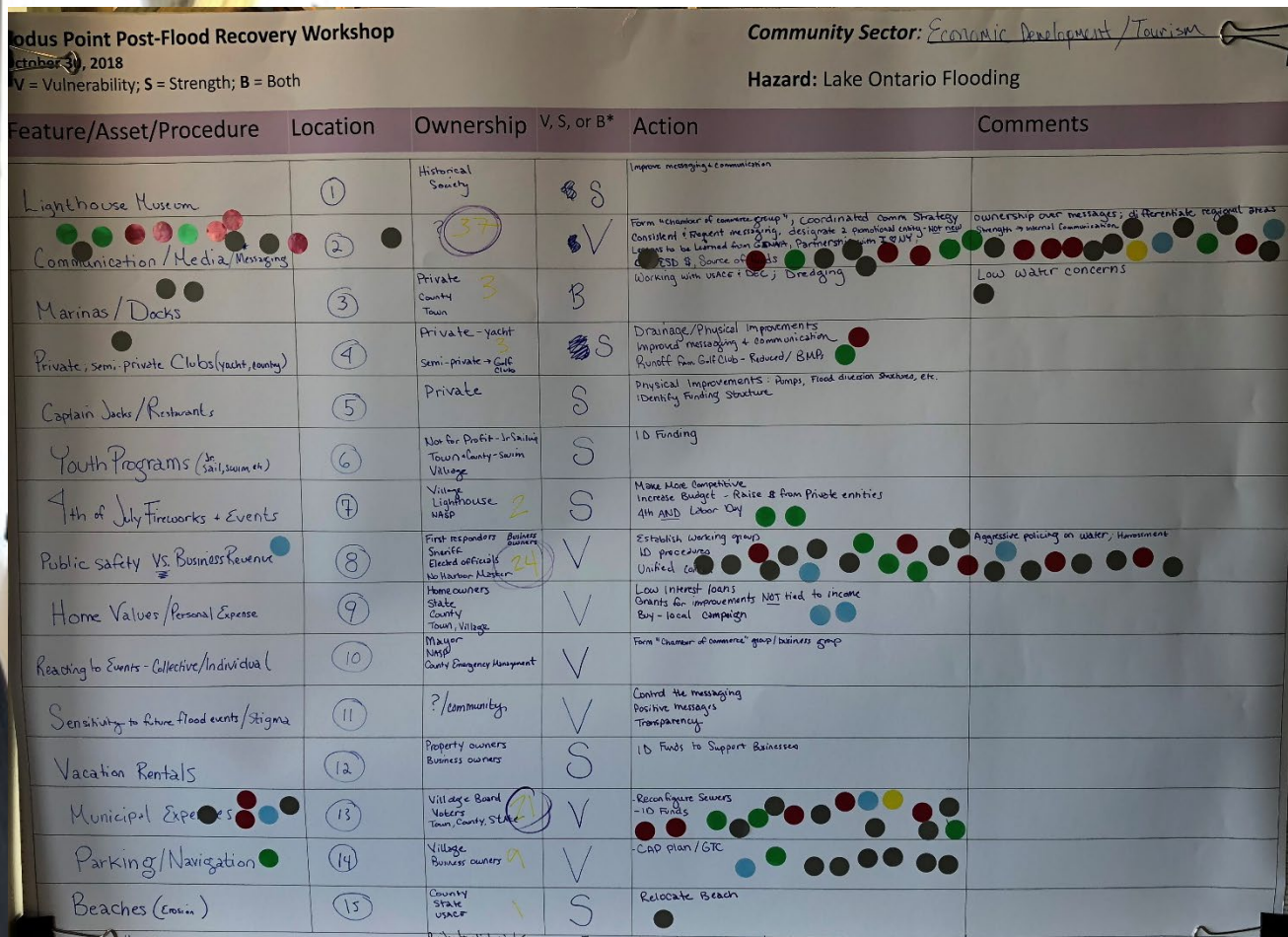
www.CommunityResilienceBuilding.org

...follow the action on

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 others, Partnerships (Cornell, IJC, UVM) CSD $, Source of funds	ownership over messages; differentiate regional areas Strengths → 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 2, 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, Sheriff, Elected officials, No Harbor Master, Business owners 24	V	Establish working group, ID procedure, Unified command	Aggressive policing on water; Harassment
Home Values / Personal Expense	9	Homeowners, 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, NASP, 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	

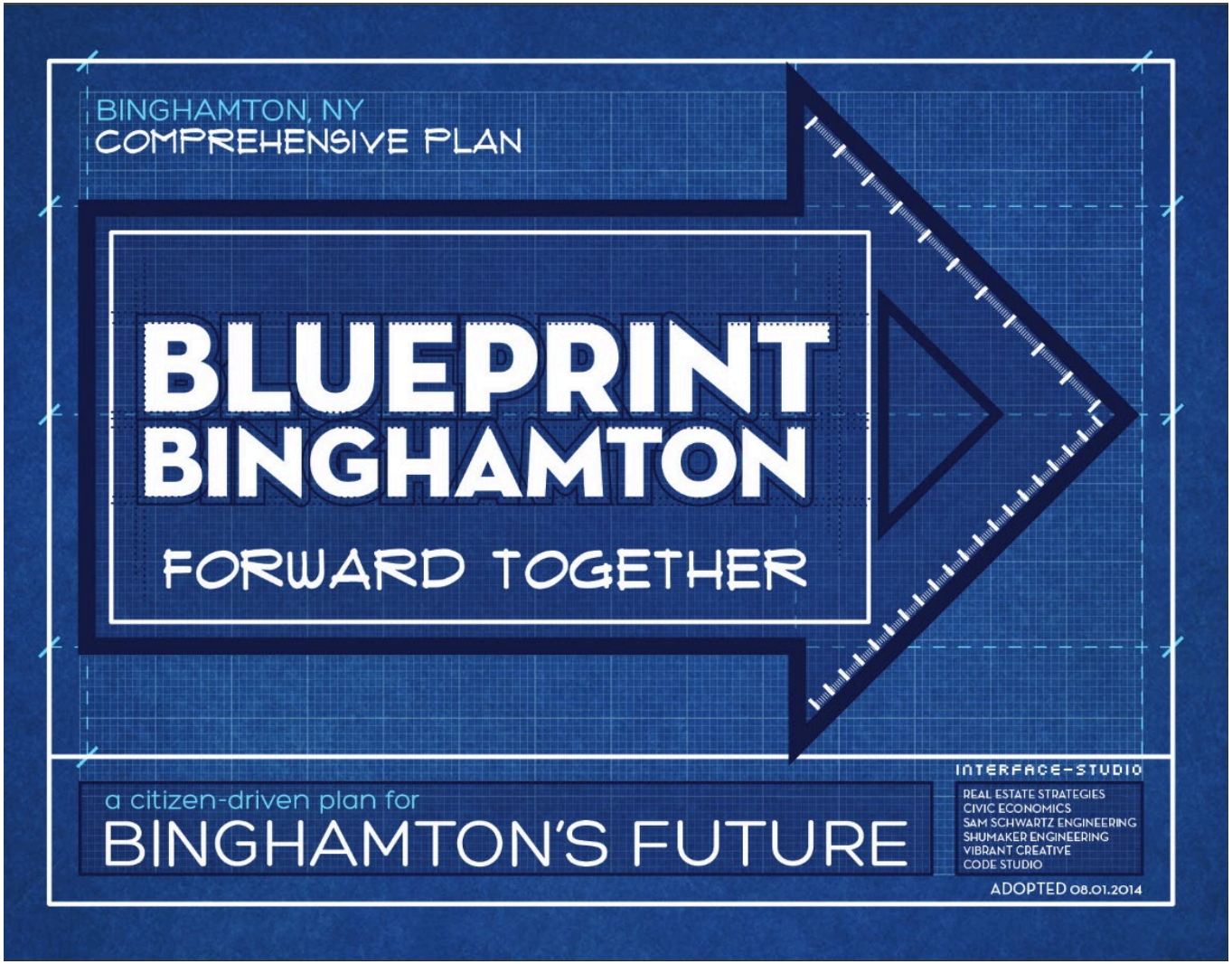
Resiliency Actions:
Communication strategy

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)

2011: Lourdes Hospital, Binghamton

What building resiliency looks like: Binghamton-Johnson City Joint STP Case Study

After repeated disaster came the planning



Over the last 5 years has your community suffered impacts from a weather event?

- *If yes, did it disrupt the economy, functionality of the municipal staff, left longstanding impacts to the community or required assistance from outside the municipality (i.e., County, State or Federal)?*

Paying for Resiliency

You can’t (necessarily) buy resilience

But, you can become resilient by investing in things that will make you so.

- Infrastructure upgrades
- Community planning
- Building capacity
- Economic development

And you can do that through….

- Looking at local funds to get some initial work done
- Apply to Regional Economic Development Council CFA funding programs such as:
  - Climate Smart Communities
  - DEC Engineering planning grants

Some popular funding programs

- ESD Grants
  - Infrastructure Investments, Economic Investments
  - Up to 25% of total project costs (Painted Post Trail)
  - ESD also funds strategic planning studies
- HCR
  - Community Development Block Grant (Public Infrastructure, Public Facilities, Planning) 50k-600k
  - New York Main Street – for targeted building renovations (up to 75%/500k) or technical assistance (up to 95%/20k)
- NYS DOS
  - Local Waterfront Revitalization Program – plan development or implementation; hamlets, downtowns, waterfronts
  - Canalway Grants – development along designated canals (50%)
  - Local Government Efficiency

Some popular funding programs

- NYS Ag/Markets
  - Ag district planning grants
- NYS Environmental Facilities Corporation
  - *Wastewater Infrastructure Engineering Planning Grant
  - 30k for planning study (80% + $7,500 local match)
  - WQIP – up to 85% total costs for addressing local water quality improvements.
  - Green Innovation Grant Program (GIGP) – up to 90% of total costs for stormwater street trees, wetland construction, bioretention, stream daylighting, etc.

Some popular funding programs

- USDA Rural Development (not CFA)
  - Water/wastewater/stormwater
  - Community Facilities
  - Distance Learning Telemedicine
  - Housing Loans/grants

https://regionalcouncils.ny.gov/cfa

REDC and the CFA

Selection Criteria for NYS DEC/EFC Wastewater Infrastructure Engineering Planning Grant from 2017		
	Points Assigned	Criteria
Regional Economic Development Priority	20	Alignment with the goals and priorities of its REDC
Performance Measures	40	Severity of existing water quality impairments
Strategies	24	Proposed project is required by a Consent Order, SPDES permit or TMDL
Process	8	Local commitment
Vision	4	Planning project is identified in a formally adopted plan
NYS DEC Regional Priority	4	Alignment with the goals and priorities of the DEC region that the project is located

What can you do now?

Inexpensive and quick tips:

- Self assessment
- Look at what others have done
- Check out tools with broad applications
- Talk to people
- Reach out to experts

Thank you for attending today's session!

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Syracuse University

Sea Grant
New York