

# How can l prepare my comunity for coastal hazards?

THURSDAY, JUNE 17, 2021 1:00 – 3:30 P.M.



## Resilience is...

the capacity for a community and its ecosystem to withstand extreme events and other forces or risks; quickly recover the interconnected social, economic and ecological systems' structure and function in the aftermath of a disaster; and develop ongoing adaptability to rapidly changing environmental conditions and forces.

-NY Coastal Management Program Plan

# Coastal Resiliency Resources

## Planning & Construction Funding

Non-Ag NPS Planning Grant, WQIP, CSC, GIGP – CFA Due July 30!

- Green infrastructure
- Nature-based streambank/shoreline stabilization
- Stream corridor assessment study
- Stream culvert repair and replacement
- Bathing beach restoration
- Etc.

## Guidance, Tools, Info, etc....

- Community Risk & Resilience Act
  - Natural Resilience Measures
  - Flood Risk Mngt
  - Model Local Laws to Increase Resilience





## Agenda

- Introductions, housekeeping, resources
  - Send questions through chat function at any time
  - Meeting will be recorded
- What hazards do communities need to plan for? Roy Widrig, NYSG
- What can help my community be more resilient? Mary Austerman, NYSG
- How can I prepare my community for coastal hazards? Panel
  - Community Rating System: John Gauthier, Town of Greece
  - Climate Smart Communities: Dazzle Ekblad, NYS DEC
  - Using local law to reduce flood risk: Barbara Kendall, NYS DOS
  - Intermunicipal Overlay Districts: Jayme Thomann, Bergmann & Associates
  - Post Flood Recovery Visioning: Dave McDowell, Mayor, Village of Sodus Point
- Question & Answer Session

## What Hazards do Communities Need to Plan For?

Roy Widrig, New York Sea Grant Great Lakes Coastal Processes and Hazards Specialist <u>rlw294@cornell.edu</u> / @quaternaroy



# Great Lakes Weather & Climate

- "Climate is what you
   expect, weather is what you get."
- NOAA Understanding Climate Normals: <u>https://www.climate.g</u> <u>ov/news-</u> <u>features/understanding</u> <u>-climate/climate-</u> <u>change-and-1991-2020-</u> <u>us-climate-normals</u>



Source: Cosmos on National Geographic

# Great Lakes Hazards are Driven by Weather



# Great Lakes region's climate keeps getting warmer, wetter, and wilder



TOM HENRY 🗹 The Blade thenry@theblade.com



- Temperature
  - Heat \_ extreme heat, drought
  - Cold lack of winter ice, ice jams
- Wind Events
  - Seiche
  - Meteotsunami and Derecho
  - Shoreline erosion
- Precipitation
  - Flooding (coastal and riverine)
  - Morphological changes

# Lake Level Fluctuations

- Driven by *watershed* precipitation
- Key element to coastal hazards, but not everything
- Brief outlook: warmer (evapotranspiration) and wetter (NOAA 10year normals)
- <u>https://www.weather.</u> gov/greatlakes/



USACE Water Level Outlook for 2021

## Weather + Landscape = Coastal Geohazards







# Shoreline Ice – Or lack of



## Ice Jam Flooding

- Freeze/thaw + rise/fall of riverine water levels
- Normally situated around choke points geographically narrow river stretches or bridges, channelized stretches
- US Army Corps of Engineers Ice Jams Datatbase: <u>https://icejam.sec.usace.army.mil/ords/f?</u> <u>p=101:7</u>::::::
- Great Lakes Ice Cover: <u>https://www.glerl.noaa.gov/data/ice/#cu</u> <u>rrentConditions</u>



Influence of November 2020 Seiche on Lake Erie Shoreline

# Wind & Storm Surge

## • Seiche





# Wind & Storm Surge

- Meteotsunami and Derechos
- Significant, but rare and short-lived wind or pressure change events
- Lake Michigan 2018





"Almost" derecho, Summer 2019, Greene Point, Lake Ontario https://www.weather.gov/lmk/derecho

Lake Michigan meteotsunami, credit: CIGLR

# **Coastal Flooding**





Oswego, NY – Upland/Coastal Flooding



Moon Beach, Cayuga County: NY's fastest eroding shoreline.

Erosion behind a seawall, Lake Erie.





# **Tools for Weather Resilient Communities**

## Flood Maps Impact Important Decisions







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To Identify and Assess the Flood Risk To Establish Rates for Flood Insurance To Determine Local Land Use To Inform Engineers and Developers To Equip Emergency Managers



**FEMA Coastal Maps** 



## **Process for Updated FEMA Coastal Maps**



# **FEMA Coastal Maps**



## FEMA Flood Map Service Center: Welcome!

Navigation

Q Search



MSC Home

MSC Search by Address

MSC Search All Products

 $\checkmark$  MSC Products and Tools

Enter an address, a place, or longitude/latitude coordinates:

Enter an address, a place, or longitude/latitude coo

Looking for a Flood Map? 😢



Looking for more than just a current flood map?

Visit **Search All Products** to a cess the full range of flood risk products for your community.



## https://msc.fema.gov/portal/home



## FEMA Flood Map Service Center: Search All Products

Choose one of the three search options below and optionally enter a posting date range.

Jurisdiction		Jurisdiction Name	Product ID 🔞
State		Jurisdiction Name or FEMA ID	Product ID
NEW YORK	~		
County		(Ex. Fairfax County-wide or 51059C)	(Ex. Panel Number, LOMC Case Number)
ERIE COUNTY	~		
Community			
EVANS, TOWN OF	~		

> Filter By Posting Date Range (Optional)

Search Clear All Fields



Q Search

🔇 Languages

MSC Home

MSC Search by Address

MSC Search All Products

✓ MSC Products and Tools

Hazus

LOMC Batch Files

Product Availability

MSC Frequently Asked Questions (FAQs)

MSC Email Subscriptions

## Search Results for EVANS, TOWN OF

Click <u>subscribe</u> to receive email notifications when products are updated. If you are a person with a disability, are blind, or have low vision, and need assistance, please contact a <u>map specialist</u>.

**Please Note:** Searching All Products by county displays all products for all communities within the county. You can refine your search results by specifying your specific jurisdiction location using the drop-down menus above.

- Effective Products (34) (2)Preliminary Products (0) (2)
- Pending Product (21)
- Historic Products (103)
- Flood Risk Products (5)



╞ Effective Products (34) 😯		
╞ Preliminary Products (55 )	0	
📂 Pending Product (21) 😢		
<ul> <li>FIRM Panels (13)</li> </ul>	OL ALL	••••

**Please note:** Searches often result in many map files listed under a given section. You can determine the Product ID for the individual map panel needed by looking at the Map Index file. The index map files have "IND" within the Product ID and appear at the start of the list. These index files show an overview of a jurisdiction and how it is subdivided into map panels with the Product ID for each panel shown.

Show 100 ~ entries

Showing 1 to 13 of 13 er	Previous 1	Next			
Product ID	Effective Date	LOMC	Size	Download	View
36029CIND0C	06/16/2021		1MB	<b>₽</b> DL	VIEW
36029C0433J	06/16/2021		10MB	<b>₽</b> DL	VIEW
36029C0434J	06/16/2021		18MB	<b>₽</b> DL	VIEW
36029C0437J	06/16/2021		18MB	<b>₽</b> DL	VIEW
36029C0438J	06/16/2021		5MB	<b>₽</b> DL	VIEW







ABOUT TOOLS TRAINING TOPICS STORIES DATA

# More Than Just Data

- 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

**Explore Hazards** 

Assess Vulnerability & Risks

**Investigate Options** 

**Prioritize & Plan** 

Take Action



Digital Coast Academy offers a wide range of learning resources.

FIND mapping, sea level rise, etc.

View all 192 trainings

## Scheduled Training



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Classroom, Instructor-Led Bring these courses and our instructors to your location.

### Online, Instructor-Led

Learn at your desk, or a coffee shop, with sessions taught in real time by our instructors.

## Upcoming Offerings

The NOAA Office for Coastal Management has a training curriculum devoted to coastal resource management. Courses are scheduled throughout the year.

### Browse Course Calendar

### Additional Resources

You may also be interested in additional training resources from our Digital Coast and Contributing Partners.

### On-Demand Products



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### Self-Guided Resources

Develop and practice new skills on your own time with







### Case Studies

Learn from these peer-to-peer case studies how other coastal practitioners have tackled thorny issues.

### Publications



### Explore the digital library of topical publications and studies.



### Quick References



Access helpful worksheets, checklists, and tip sheets.



### Videos And Webinars

View short videos that make difficult topics easier to understand. View recorded webinars to learn from experts in the field.





🔒 Home | Training | Training Calendar

The NOAA Office for Coastal Management has a training curriculum devoted to coastal resource management. Courses are scheduled throughout the year. Visit our website to learn more. Many of the courses listed below can be completed via the website, and we encourage you to register. Others are offered on-site by guest hosts. If you wish to apply to host a course at your location, or for additional course or registration information, please e-mail us at ocm.tms@noaa.gov.

Classroo	m 🌑 Online				
	Course Name $_{\oplus}$	Date 😑	Location $_{\oplus}$	Host $_{\oplus}$	Register
	Virtual - Facilitation Basics for Coastal Managers	Jun 15, 2021 - Jun 16, 2021 10:00am - 1:00pm Eastern	Live Webinar	Office for Coastal Management	For additional information or to register, e-mail Vidya.Balasubramanyam @illinois.gov
	Virtual - Planning Effective Projects for Coastal Communities	Jun 15, 2021 - Jun 17, 2021 11:30am - 3:00pm Eastern	Live Webinar	Office for Coastal Management	REGISTER
	Funding and Financing Coastal Resilience	Jun 22, 2021 2:00pm - 3:30pm Eastern	Live Webinar	Office for Coastal Management	REGISTER
	Seven Best Practices for Risk Communication	Jun 23, 2021 2:00pm - 3:30pm Eastern	Live Webinar	Office for Coastal Management	REGISTER

## Coastal and Waterfront Smart Growth Guide



OURATION Self-Paced

### Overview

Communities can use smart growth strategies to achieve environmental, social, and economic goals. This online guide outlines ten coastal smart growth elements and provides a wide range of tools and techniques for incorporating these elements into community planning efforts. The guide also highlights the connection between smart growth strategies and community resilience and green infrastructure.

## This Guide Features

TRAINING TYPE

Self-Guided Resources

- Ten smart growth elements. Use these elements to help your community reach its planning goals.
- Polices and techniques. Choose a technique or policy to help incorporate smart growth elements into your community planning project.
- Case studies. Stories of how communities have incorporated smart growth provide additional information about green infrastructure planning.
- Resilience resources. Find hazard-resilient smart growth tools and success stories.



### Additional Information

LAUNCH

Hazard-Resilient Smart Growth Case Studies



Steps to Resilience Case Studies Tools Expertise Regions Topics

Search

## • Web-based

- National one-stop-shop
- Key features:

which share the

- Tutorial videos, case studies, tools, & search option
- searchable by threat, resilience step, topic, and region
- Share local stories
- Helpful for steps 1-4

**Explore Hazards** 

Assess Vulnerability & Risks

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Steps to Resilience Case Studies Tools Expertise Regions Topics



## **Great Lakes**

Increases in extreme precipitation events, changes in growing seasons, and warming temperatures impact the people, ecosystems, and infrastructure of the Great Lakes region —and the lakes themselves. Given its energy-intensive economy, the region has the potential to reduce emissions that cause climate change and adapt to the impacts already being experienced.

### Home > Regions > Great Lakes >



TWEET

PRINT

- Extreme rainfall events have increased over the last century, and these trends are expected to
  continue. Combined with land cover changes, increased precipitation has and likely will continue
  to lead to flooding, erosion, declining water quality, and negative impacts on transportation,
  agriculture, human health, and infrastructure.
- In the next few decades, longer growing seasons and rising carbon dioxide levels will increase yields of some crops; those benefits will be progressively offset by extreme weather events. In the long term, the combined stresses associated with climate change are expected to decrease agricultural productivity.
- The composition of forests in the Great Lakes is changing as the climate warms. Many tree species are shifting northward, with more southerly varieties replacing them. Many iconic north wood tree species will lose their advantage and be slowly replaced over the next century.
- Increased heat wave intensity and frequency, increased humidity, degraded air quality, reduced water quality, and change in vector-borne disease patterns will increase public health risks.
- The Great Lakes region has a highly energy-intensive economy, with per capita emissions of greenhouse gases more than 20 percent higher than the national average. The region also has a large and increasingly utilized potential to reduce emissions that cause climate change.

## **Browse Regions**

Regions

## Alaska and the Arctic

### Great Lakes

- People and Communities
- Infrastructure and the Built Environment
- Agriculture, Forests, and Ecosystems
- Building Resilience in the Great Lakes

Hawai'i and Pacific Islands Midwest Northeast

Southeast

## People and Communities

Public health risks will increase as temperatures warm due to increased intensity and frequency of heat waves, higher humidity, degraded air quality, reduced water quality, and new opportunities for vector-borne disease. At-risk communities are becoming more vulnerable to climate change impacts; tribal nations are especially vulnerable because of their reliance on threatened natural resources for their cultural, subsistence, and economic needs.

### Home Regions Great Lakes People and Communities



Higher temperatures, more variable precipitation patterns, and changes in lake levels are likely to increase the vulnerability of human systems in the Great Lakes—including cities, rural and coastal communities, and tribes—to extreme events such as flooding, drought, heat waves, and more intense urban heat island effects. These impacts will compound already existing non-climate stressors such as economic downturns, shrinking cities, and deteriorating infrastructure. Vulnerable communities and tribal nations in the region may be disproportionately affected.

## Public health

### Extreme heat

The frequency of major heat waves has increased over the past several decades, both nationally and in the Great Lakes region. Nationally, observations show that mortality increases by four percent during heat waves compared with non-heat days. One study projected an increase in excess deaths from heat wave-related mortality in Chicago of between 166 (lower emissions scenario) and 2.217 (higher emissions scenario) per year by the end of the century.





The graph shows the annual number of days above 100°F in Chicago for the historical period of 1976–2005 (black dot) and projected throughout the 21st century under lower (teal) and higher (red) scenarios. Increases at the higher end of these ranges would pose major heat-related health problems for people in Chicago. Click the image for more information.

## Browse Regions

### Regions

Alaska and the Arctic

### Great Lakes

- People and Communities
- Infrastructure and the Built Environment
- Agriculture, Forests, and Ecosystems
- Building Resilience in the Great Lakes

Hawai'i and Pacific Islands Midwest Northeast Southeast

## **Case Studies**

College of Menominee Nation's Sustainable Development Institute Builds Capacity for Tribal Climate Change Adaptation >

Integrating Education and Stormwater Management for Healthy Rivers and Residents >

The Fond du Lac Band of Lake Superior Chippewa Combine Mitigation with Capacity Building >

## **Related Tools**

Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu >





- 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

**Explore Hazards** 

Assess Vulnerability & Risks



☑ Layers 幸 Controls & Legends 1 Q Quick Z	n Ottawa Montr a M D A David
Search for layers	Gatineau 7 Lo Sase Map 1
Sectors: All Sectors	Cornwall
▶ Agriculture	Owen Sound Orillia Brockville GREEN MOUNTAINS
▶ Air Emissions	Barrie Lake Peterborough WHITE
▶ Boundaries	Belleville Kingston
Climate Observations	White Mountain
▼ Climate Projections	Vaughan o o Oshawa
▶ Degree Days	Brampton o Toronto Lake Ontario
Precipitation	Kitchener Oakville Mississauga
▼ Temperature	Hamilton St Concord
Average Temperatures (Projected)	ndon Brantford Niagara
Days < 0 °F (Projected)	Falls
☑ Days < 32 °F (Projected)	
Days > 90 °F (Projected)	
□ Davs > 95 °F (Projected)	ake Erie
Days > 100 °F (Projected)	Springfield
Maximum Temperatures - Average (Projected)	Hartford Hartford
Minimum Temperatures - Average (Projected)	Allegheny ALLEGHENY MOUNTAINS
<ul> <li>▼ Coastal Zones</li> </ul>	Forest PENNSYLVANIA Scranton CONNECTICUT
Flood Exposure	Bridgeport
HAZUS Critical Facilities	NEW JERSEY
Hurricane Sandy Surge Extent	State College
Sea Level Rise (Dewberry)	Pittsburgh Altoona Allentown Edison

## Location Info

Days < 32 °F (Projected)

Chautauqua

		Proje	Projected change in # days below 32 °F			
Season	Baseline (days)	Scenario	2030s	2050s	2070s	2090s
Annual	142.5	High	-13	-24.5	-41	-56.7
		Low	-13.3	-21.7	-29.4	-34.4
Fall	20.5	High	-3.8	-7.4	-10.8	-13.8
		Low	-3.9	-6.3	-8.1	-9.1
Spring	40.1	High	-3.4	-8.4	-14.2	-18.6
		Low	-4.3	-7.7	-10.2	-12.6
Summer	0.1	High	0	0	-0.1	-0.1
		Low	0	-0.1	-0.1	0
Winter	81.8	High	-5.7	-9.1	-16.3	-24.5
		Low	-5.4	-7.7	-11.2	-12.7

## Layers 🗄 Controls & Legends

Climate Observations

Climate Projections

Degree Days

- Precipitation
- ▼ Temperature

Average Temperatures (Projected)
 Days < 0 °F (Projected)</li>
 Days < 32 °F (Projected)</li>
 Days > 90 °F (Projected)
 Days > 95 °F (Projected)
 Days > 100 °F (Projected)
 Maximum Temperatures - Average
 Minimum Temperatures - Average

Flood Exposure

HAZUS Critical Facilities

Hurricane Sandy Surge Extent

□ Sea Level Rise (Dewberry)

□ Sea Level Rise (SIT/Columbia)

## Days < 32 °F (Projected) projected\_temp\_lt\_32

Service Status Folder Description Sectors Source Source URL Download URL MetaData URL

## 0 Errors

## Climate Projections.Temperature

Projected changes in the number of days per season or annually with temperature below threshold values. Changes are relative to the 1971-2000 mean, calculated for four periods 2020-2049 (2030s), 2040-2069 (2050s), 2060-2089 (2070s), 2080-2099 (2090s). The projections are derived from statistically downscaled (LOCA method) CMIP5 daily data. Data Source: Statistically downscaled CMIP5 daily Climate Observations using Localized Constructed Analogs (LOCA; Pierce et al., 2014). All Sectors

University of California San Diego as provided by the Northeast Regional Climate Center Applied Climate Information System (ACIS) at Cornell University (rcc-acis.org)

geoserver.nescaum-c..rojected\_temp\_lt\_32 loca.ucsd.edu/

LLEGHENY MOUNTAIN
# **Community Planning**

- <u>Regional Niagara River/ Lake Erie Watershed Management</u>
  <u>Plan Phase 2</u>
- Highlights:
  - Environmental Overlay Districts
  - Open Space Preservation
  - Integrate Resilience into Regulatory Framework
  - Intermunicipal Agreements
  - Collaborate
  - Shared services
- Helpful for steps 1-5

**Explore Hazards** 

Assess Vulnerability & Risks

**Investigate Options** 

Prioritize & Plan

Take Action

UNDERSTANDING HOW PREPARED YOUR COMMUNITY IS FOR COASTAL-FLOODING AND WEATHER DISASTERS



#### NEW YORK'S GREAT LAKES COASTAL RESILIENCE INDEX: A Community Self-Assessment

**NEW YORK SEA GRANT** 

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

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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**

Lake Ontario Inundation Map Package Tutorial	
Lake Ontario Inundation WebMap Tutorial	
Coastal Flooding Narrative*	
2017 Lake Ontario Flood	
Weather Disaster Narratives and Variables*	
Blizzard	
Flash Flood from Heavy Precipitation	
Flash Flood from Ice Jam	
Ice Storm	
Windstorm	

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", communitydriven 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



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#### **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 >

#### **NOAA Lake Level Viewer**



Lake Superior	Lake Michigan	Lake Huron	Lake St. Clair	Lake Erie	Lake Ontario

NOTE: Panning between lakes without changing location in the lake drop-down menu will result in incorrect lake levels displayed. Water level elevations values shown in the water level selector are specific to each Lake.

#### Disclaimer

The data and maps in this tool illustrate the scale of potential flooding or land exposure at a given water level, not the exact location. They do not account for erosion, subsidence, or future construction. Water levels are shown as they would appear during calm conditions (excludes windedriven changes in water levels). The data, maps, and information provided should be used only as a screening-level tool for management decisions. As with all remotely sensed data, all features should be verified with a site visit. The data and maps in this tool are provided "as is," without warranty to their performance, merchantable state, or fitness for any particular purpose. The entire risk associated with the results and performance of these data is assumed by the user. This tool should be used strictly as a planning reference tool and not for navigation, permitting, or other legal purposes.

ational Ocean Convice I Website owner: Office for Coastal Management I. Last Medified: 0

#### https://cdn.knightlab.com/libs/juxtapose/latest/embed/index.html?uid=cde98db0-c994-11eb-b7bf-95443c729a29

# Lake Ontario Flood Forecast Mapper

Earth Engine Apps Experimental

#### Q

Wilson, NY, USA

#### Lake Ontario Flood Mapper

#### Static Water Level Forecast (246.03 feet)

Select a county to see predicted flooding for that area. These flooding predictions are based on monthly static water level forecasts.\*

The static water level of 246.03 feet (74.99 meters) is currently based on the most up-to-date ECCC forecast (Mapping application last updated March 4, 2021 for the April forecast).

#### County

Cayuga

Jefferson

Monroe

✓Niagara

Orleans

Oswego

Wayne



### Lake Ontario Inundation WebMap



# **Comparison Chart Interactive Inundation Mapping Tools**



**Post-Disaster Planning** 



#### Flood Risk Sodus Point, NY, Wayne County



# Overall Impact Sodus Bay, Wayne County



	Benchmark	Scenario	facility functions	Notes:
Critical Facilities				
Water level (feet)	249'	249.5'		
Example: power grid	X		x	
Section B: Critical Facilities*				
Municipal Hall			x	
Municipal Department of			x	
Public Works				
Critical record storage	X	X		
(list):			x	
Policy station or other law enforcement building(s)			x	
Fire station(s)			х	
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
			x	
Emergency operation center				Highway barn; County OEIVI; 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	





Get on the right path to resilience today...



Community Resilience Building is a unique, "anywhere at any scale", communitydriven 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



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# Visioning Workshop: breakout groups



# Prioritization of actions

dus Point Post-Flood Recovery Workshop				Community Sector: Economic Development / Tourism		
= Vulnerability; S = Strength; B = Both				Hazard: Lake O	ntario Flooding	
ature/Asset/Procedure	Location	Ownership	V, S, or B*	Action	Comments	
Lighthouse Kuseum	0	Historical Southy	S S	Improve meaning is communication	and the and the states, differential register of	
Communication / Hedia / Mossing		3(37)	6V	Form actination of essential provide a pomotion Consistent a French dan Saving designate 2 pomotion Learners to be Larmed dan Saving Portnersh point ESD \$, Sarce of 13	ANN SHARAY UNITES SHARAY CANADA SHARAY	
Marinas/Docks	3	Private 3 County 3 Town	B	Working with usine (DEC) Dreading	Low Warr concerns	
Private; semi. private Clubs(yacht, eanly)	4	Private - yacht Semi-private - Glf	<b>B</b> S	Drainage/Physical Impowerments Improved mataging & communication Runoff Run Golf Club - Reduced/ BMP		
Captain Jacks/Restavants	5	Private	S	Drysical Improvements: Amps, trees and Denisty Funding Stucture	natura, ex.	
Youth Programs (30, 5001 44)	6	Not for Profit - In Sailing Town a County-Sourism Villiage	S	10 Funding		
The of July Firecoorks + Events	(7)	Village Lighthouse 2 NASP	S	Marke More Competitive Increase Budget - Raise & from Private entities 4th AND Libbor Day		
Public safety VS. Business Revenue	8	First responders Builders Shariff Elected officials No Harbor Master	DV	Establish Warking group ID procedures Unified (a)	Aggressive following on Walker, Humanman	
Home Values / Personal Expense	9	Home owners State County Town, Village	$\bigvee$	Low interest loans Orants Grimprovements Not tied to incore Buy-local Comparish		
Reacting to Events - Collective/Individual	(10)	Mayor NASP County Energency Hanayment	$\vee$	Form "Chanter of commerce" group (bisiness Storp		
Sensitivity to fiture flood events/stigma		?/community,	$\vee$	Control the mussaging Positive messages Transparency		
Vacation Rentals	(12)	Property owners Business owners	S	10 Funds to Support Businessee		
Municipal Experses	ß	Village Board Voters Town, County, State	$\mathcal{F}$	-Reconfigure Sewers		
Parking/Navigation•	(14)	Village. Buillass owners M	$\vee$	-CAP plan/GTC	• ••	
Beaches (Errossia)	(12)	County State USACE	S	Relocate Beach		
Hickory		Risidente Historial Sec	5	add wilload bistorian Fratie		

# 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)

# **Coastal Hazard Management Options**

### Managing Shorelines



Sandy Creek, New York

- Balance of protecting assets and maintaining as many natural processes as possible
  - Find the right option for the local shoreline – no "one size fits all"
  - Learn from and work with neighbors
- The coastal zone is truly a connected system, and it's function depends on this connectivity

# The Coastal System

- Why is it important?
- Nearshore sand transport
- Maintenance of this system is key to "rebuilding" after erosion events
  - Necessary for coastal habitats
  - Rebuilds beaches and nearshore
- US Army Corps of Engineers Sediment Budget Viewer:
- <u>https://www.arcgis.com/apps/MapSeries/index.html?appid=34476ea8c07a4111841d28a5d960cb02</u>



### Shoreline Management Options

#### • "Gray to Green"



Provided by Joseph Ruszala, United States Army Corps of Engineers, Buffalo District

# Management Options

- Gray
- Seawalls, break walls, sheet piles, rock rip-rap "revetments"
- Gray Considerations
  - Highest degree of protection in some cases
  - Costly, detrimental to coastal processes, habitat, and potentially neighboring properties

Top: Henderson, NY seawall Bottom: Sandy Creek, NY rip-rap revetment





# Shoreline Management Options



Terraced shoreline example, with toe protection.

- Hybrid & Green Considerations
  - Best for environment and coastal processes, more affordable
  - Lower level of protection, repeated maintenance

- Hybrid & Green
- Beneficial dredge spoils, coir logs and mats, terracing, revegetation

Sodus Point, NY Dune Construction



### Green Infrastructure



Grassed bioswale, Southwick Beach State Park

 Incorporating GI practices into planning can improve water quality, storm water storage, and produce small packets of habitat for important and threatened native plants, animals and insects

Can be rural...

### Green Infrastructure



Array of stormwater/GI options, University at Buffalo.

• ...or urban

- Green Infrastructures helps rebuild the natural drainage network of the land lost by development or urbanization
- Additionally: derelict dam removal, de-channelization, culvert re-sizing, stream crossings, green roofs, and more

# "Do Nothing" Option

- Do nothing not as bad as it sounds
- Allows for natural evolution of the shoreline, return of sediment to the nearshore zone, and gradual rehabilitation of coastal habitats
- Always consider neighboring properties and their chosen management strategies



A very cold day in Wayne County, NY.

# Elevation and Relocation



Elevated home in Mexico Point, NY

- Non-structural options:
  - Elevation
  - Relocation
- Logistics
  - Lot size, distance, structure footprint, etc.
- Setbacks
  - Local laws for limiting how close new development can be sited to shoreline and flooding hazards
- Managed Retreat
  - A topic for another day...

### Erosion Management Guide

- Broad overview with field examples of:
  - natural resiliency options
  - non-structural
  - nature-based features
  - hard/gray revetments
- With considerations for:
  - Limitations, advantages, ecological impacts, coastal process impacts, engineering and design considerations

#### Erosion Management for New York's Great Lakes Shorelines

Roy Widrig Great Lakes Coastal Processes and Hazards Specialist



Mixture of shoreline management options on Chaumont Bay, NY Photo by Roy Widrig, New York Sea Grant.

The shorelines of Lake Erie and Lake Ontario are a dynamic, ever-evolving environment. The region is continuously affected by hydrologic and climatic forces, as well as human development. Since the last glaciers retreated more than 10,000 years ago, Great Lakes water levels have varied dramatically, as have the flows of water between these five massive lakes and their combined outflow to the Atlantic Ocean. The Great Lakes influence human activities and all aspects of the natural environment, from weather and climate to wildlife and habitat. Our knowledge of the geophysical, ecological, and socioeconomic characteristics of the region is increasing over time but we will continue to be challenged by uncertainty and the evolving nature of the natural system.



New York Sea Grant SUNY College at Oswego Oswego, NY 13126-3599 (315) 312-3042 Funding for this document was provided by the New York State Environmental Protection Fund under the authority of the New

Much of New York's Great Lakes shorelines are

naturally subject to erosion, which becomes a

concern particularly where there are homes,

businesses, or other structures nearby. There

options that can be considered for managing erosion risks; however, some coastal

applied along the shorelines of Lake Ontario

are a variety of shoreline management

landowners are not aware of the full array

of erosion protection options that can be

and Lake Erie. This booklet is intended

to give New York's coastal landowners

Lakes shorelines.

an introduction to a number of shoreline

management options available for Great

York Ocean and Great Lakes Ecosystem Conservation Act.
## Working with Nature

- Overview of nature-based and bioengineered options
- Planting guide with 40+ plants native to the Great Lakes
- Details of shoreline types, zones, and ideal vegetation matches
- <u>https://seagrant.sunysb.edu/Ima</u> <u>ges/Uploads/PDFs/GreatLakes-</u> <u>ShorelinePlantsGuide.pdf</u>

#### WORKING WITH NATURE A GUIDE TO NATIVE PLANTS FOR NEW YORK'S GREAT LAKES SHORELINES

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### Engineering with Nature



- Army Corps of Engineers EWN Atlas
- Available here: <u>https://ewn.el.erdc.dren.mil/atla</u> <u>sv2.html</u>
- Podcasts, Project Examples, "Proving Grounds"
- Designs, seminars, workshops, publications and additional tools

## New York State REDI: Building Resilience in Recovery

- Permit application process
- Overview of coastal processes and protections options for shoreline properties
- Monitoring, maintenance and repair
- Determining mean high water
- Sample plans



#### NEW YORK STATE REDI: BUILDING RESILIENCE IN RECOVERY

Homeowner Program Guidance for Shoreline Management on the Great Lakes and St. Lawrence River

KE ONTARIO RED





## Speaker panel

- Community Rating System: John Gauthier, Town of Greece
- Climate Smart Communities: Dazzle Ekblad, NYS DEC
- Using local law to reduce flood risk: Barbara Kendall, NYS DOS
- Intermunicipal Overlay Districts: *Jayme Thomann, Bergmann & Associates*
- Post Flood Recovery Visioning: Dave McDowell, Mayor, Village of Sodus Point

# **Community Rating System**

John Gauthier, Town of Greece



## **CRS** Overview

- Policy holders can save on Insurance Premiums. Most policies nationwide are in communities that participate in CRS program, if yours isn't, you are paying a premium.
- In NYS there is minimal participation as compared to the rest of the country...
- It's relatively easy for a FEMA compliant community to participate...



## **Goals of the CRS**

- Reduce flood damage,
- Strengthen and support the insurance aspects of the NFIP, and
- Encourage a comprehensive approach to floodplain management.







FORMER BANK

#### **Program Benefits**

- Reduced flood insurance rates
- Improved flood protection
- Enhanced public safety
- Improved Resiliency
- Incentive to continue compliance

# Climate Smart Community Program

Dazzle Ekblad, New York State Department of Environmental Conservation

# **DEC CSC Grants**

- Competitive, 50/50 match
- For local governments only
- Project types:
  - Climate adaptation
  - GHG mitigation outside power sector
- Total of \$11 million available in 2021; apply before July 30 at 4 p.m.
- More info at <a href="http://www.dec.ny.gov/energy/109181.html#CSC">http://www.dec.ny.gov/energy/109181.html#CSC</a>









## **CSC Grants - Implementation**

**Award size**: \$50,000 to \$2,000,000 **Engineering/design max.** of 15%

Adaptation project types related to coastal mgmt. in 2021 RFA:

- Increasing natural resilience through restoration of natural floodplain areas and wetland systems (e.g., living shorelines)
- Flood-risk reduction (e.g., strategic relocation or retrofit of critical municipal facilities that are vulnerable under climate change)
- Replacing or right-sizing bridges or culverts
- Emergency preparedness (e.g., warning systems and/or response programs)
- Completion of Community Rating System (CRS) activities





## **CSC Grants - Certification**

Award size: usually \$10,000 to \$100,000

**Certification actions** related to coastal mgmt that are eligible for grants in 2021:

- PE6 Action: Comprehensive Plan with Sustainability Elements
- PE6 Action: Natural Resources Inventory
- PE7 Action: Climate Vulnerability Assessment
- PE7 Action: Evaluate Policies for Climate Resilience
- PE7 Action: Climate Adaptation Plan







Department of Environmental Conservation

# **CSC Certification Program**

- 120 points for the bronze level, 300 for silver
- ~1 to 20 points per action, over <u>100 actions</u>
- Other actions related to coastal mgmt:
  - PE7 Action: Conserve Natural Areas
  - PE7 Action: Watershed-based Flood Mitigation Plan
  - PE7 Action: Design Flood Elevation & Flood Maps
  - PE7 Action: Freeboard Policies
  - PE7 Action: Green Infrastructure
  - PE7 Action: Culverts & Dams
  - PE7 Action: Riparian Buffers
  - PE7 Action: Strategic Relocation
  - PE7 Action: Nature-based Shorelines







Department of Environmental Conservation

# **Thank You!**

- Dazzle Ekblad
- Office of Climate Change
- NYS DEC
- 625 Broadway
- Albany NY 12233-1030
- climatesmart@dec.ny.gov
- cscgrants@dec.ny.gov
- 518-402-8448



### **Useful climate-related sites:**

- <u>Regional GHG Inventories for NY (2010)</u>
- <u>NY Climate Change Science Clearinghouse</u>
- CLCPA: <a href="https://climate.ny.gov/">https://climate.ny.gov/</a>
- <u>Community Risk and Resiliency Act</u>
- NYS ClimAID report (projections & data)
- Sustainable Shorelines



# Model Local Laws

Barabara Kendall, New York State Department of State

### Model Local Laws to Increase Resilience: Local Implementation of NYS CRRA\*

Importance of local government; Local Waterfront Revitalization Program connections

Models created from:

- Existing model laws
- Good examples of current local laws
- Combining sections from various laws

Adapt for local use

- Plug in sections to update existing laws OR
- Use entire model law for relevant topics

\*Community Risk and Resiliency Act





https://dos.ny.gov/model-local-laws-increase-resilience

## Each Model Local Law: Content

#### Title, background and purpose

- Information about the subject, benefits
- References

### <u>Usage</u>

- Which existing local law(s) and section(s) in those laws to amend; or adopt a new law

### Adapted from the following source

- Municipality name; sometimes other states or programs

#### Local law language



DFE – Design Flood Elevation
 BFE – Base Flood Elevation

**F**reeboard

1

Ch. 1 Examples: Basic Land Use	MLLs
Tools for Resiliency	SECTION
Waterfront Overlay District	1.1.2
Waterfront Bluff Overlay District	1.1.3
Minimum Lot Size	1.2.1
Maximum Lot Coverage	1.2.3
Ch. 4 Examples: Management of	MLLs
Floodplain Development	SECTION
Floodplain Development Floodplain and wetland resource conservation overlay district	SECTION 4.2

**Office of Planning**, **Development &** Community Infrastructure https://dos.ny.gov/localwaterfront-revitalizationprogram (518) 474-6000

Division of Local Government Services https://dos.ny.gov/servic es-and-support (518) 473-3355



Office of Planning and Development

# Intermunicipal Overlay Districts

Jayme Thomann, Bergmann & Associates

#### B How can I prepare my community for coastal hazards? OVERLAY ZONING DISTRICTS - EPODS



#### B How can I prepare my community for coastal hazards? INTERMUNICIPAL OVERLAY DISTRICT



GMU § 119-U. Intermunicipal cooperation in comprehensive planning and land use regulation



- Intermunicipal agreements can be used to "create an intermunicipal overlay district for the purpose of protecting, enhancing, or developing community resources that encompass two or more municipalities"
- Delineation of local boundaries/Intermunicipal
  Overlay District
- Actions for Referral
  - Regulated Actions
  - Minimum Standards for Intermunicipal Enforcement
- Referral Process
  - Factors for consideration

# B How can I prepare my community for coastal hazards? IMPLEMENTATION

#### Updates to the City of North Tonawanda Zoning Law

- Utilized the Local Waterfront Revitalization
  Program process
- Provided recommendations for the existing Waterfront District to establish a Waterfront Mixed Use (WMU) District:
  - encourage public access to the shoreline
  - promote public enjoyment of the riverfront
  - encourage appropriate waterdependent and water-enhanced uses
  - ensure an appropriate density and scale of new development



#### New York General Municipal Law (GML) 239 County Review, which

requires that certain types of municipal planning, zoning, and subdivision projects be referred to County Planning for review prior to local action being taken, is another tool...

# Post-flood Recovery Visioning

Dave McDowell, Mayor of Sodus Point



## Sodus Point 2017

#### Lake level 248.5



NYSG's post-flood recovery planning provides communities the opportunity to improve resilience to future flooding

#### **Post-Flood Recovery Visioning: Sodus Point, NY**

Research has long shown that, in the absence of some larger vision for the future, residents of communities recovering from a hazard event such as severe flooding have an operative idea of their rebuilt community—almost invariably it resembles the community they already knew.

The record-high Lake Ontario water event in 2017 hit the Village of Sodus Point (Wayne County, N.Y.) hard. Water overran shoreline and breakwalls causing persistent inundation to waterfront homes and businesses, and flooding streets.

New York Sea Grant (NYSG) and the Genesee/Finger Lakes Regional Planning Council (G/FLRPC) established and piloted a visioning process to help communities improve their resiliency to future flooding events. This process, designed to be transferable to other communities, included implementing a selfassessment checklist and hosting a public engagement workshop. The workshop was held in the Village of Sodus Point.



Above: Post-flood recovery visioning workshop breakout session; upper right: prioritizing suggested actions. Photos: GLRPC/Jayme Thomann

A self-assessment checklist identifying flooding



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Sandbagging Operations By Day / Priority Sodus Point, N.Y.

_	Protected
_	Unprotected, no sandbagging
_	Unprotected, to be sandbagged

	January 1-15	January 16-31	February 1-15	February 16-28	March 1-15	March 16-31	April 1-15	April 16-30	May 1-15	May 16-31	June 1-15	June 16-30	July 1-15	July 16-31	August 1-15	August 16-31	September 1-15	September 16-30	October 1-15	00
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246.	2 Article A	Article A	Article A	Article A	Article A	Article A	Article A													
246.	3 Article A	Article A	Article A	Article A	Article A	Article A	Article A													
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 2-4: 17 pallets
 2-5: 46 pallets 8595 - 2 On existing Brong Unprotected 8593 - 2 on , existing ts 4-4: 20 pallets - 2 Hoper toget 4391 10vec 4583 - 2 Higher to ferrer to vece 4583 to garler Potrus - Add 1 Row in middle low Spot









249 ft) Both Inundation Scenarios Example (247.3 ft &

South Pond Sandy Creek, New York Water Level Scenario: 247.3 feet Community Resilience Index (CRI) 4/30/2019 Data Sources: Water Level: NOAA Rachester Gage(https://iidesandeurrents.no Elevation: FEMA Im DEM (FEMA Great Lakes Area 2014: http://tp. and Monroe County It DEM (waliable for purchase from Monri https://www2.monroecounty.gov/gis-Data.php)









#### WICKHAM BLVD. AND GREIG ST.

This project seeks to address recurring flooding in the Village of Sodus Point that occurs during high water events, particularly on Wickham Blvd. and Greig St. A multi-purpose conceptual design for flood protection will include a bench sitting area along the road for recreational opportunities.



#### WHITE BIRCH CAMPGROUND WASTEWATER INFRASTRUCTURE

This project seeks to address erosion encroaching on an eight-inch sewer line at the White Birch Campground in the Village of Sodus Point. The campground has direct exposure to the lake and continued erosion would expose the eight-inch sewer line that serves approximately 200 residences.

Village of Sodus Point, Wayne County

Village of Sodus Point

590,000

\$



#### LAKESTONES DR.

This project seeks to address erosion and protect wastewater infrastructure west of and along Lakestones Dr. in the Village of Sodus Point. Currently two homes with wastewater mains across the properties are at risk of being damaged if erosion is not controlled. There is also a sewer manhole several feet from the lakeshore.



#### Village of Sodus Point, Wayne County Village of Sodus Point 342,000



#### SODUS POINT BEACH

This project seeks to address loss of beachfront from erosion and flooding of private residences and streets adjacent to Sodus Point Beach. The beach is exposed directly to the lake, including wave action, and is susceptible to flooding during high water events, limiting the use of the beach area for residents and tourists visiting Sodus Point.

- Village of Sodus Point, Wayne County
  - Village of Sodus Point
- \$ 490,000











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Jayme Breschard Thomann, AICP, CFM Senior Project Manager at Bergmann jthomann@bergmannpc.com 585-498-7957 Shannon Dougherty Watershed Coordinator, GL Watershed Program New York State DEC <u>shannon.dougherty@dec.ny.gov</u> 716-851-7070

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David McDowell Mayor, Village of Sodus Point, NY dmcdowell@soduspoint.info

Roy Widrig GL Coastal Processed and Hazards Specialist New York Sea Grant

315-312-3042