

# Coastal Resiliency in Western New York

- **What is Coastal Resiliency/Climate Resiliency?**
  - “Living Shorelines”
  - Nature-based design (coastal engineering and defenses)
  - Natural or “Green” Infrastructure
- **What we are seeing and experiencing – in WNY and throughout the Great Lakes Basin**
  - Increased frequency, duration, and intensity of storm events
  - Lake seiche, ice shove, high winds
  - Above average lake temperatures and levels
  - Damage and disruption to waterways, shorelines, properties and infrastructure

# Current conditions in WNY waterfront zones dominated by:

- “Hardened” shorelines - deflect and exacerbate wind and wave energies – crumbling shoreline infrastructure
- Flood storage capacity lost to paved or developed surfaces
- Shoreline instability, erosion and pollutant runoff directly into waterways
- Over 60% of Niagara River wetland systems and aquatic habitat lost since 1960s





# Climate & coastal resilient shorelines returning to WNY:



- Seamless transitions between land and water
- Coastal engineering absorbs wind and wave energies
- Increasing capacity for flood storage, improved fish and wildlife habitat
- Improved aesthetics, recreational opportunities, and property values

# Local Examples of Climate Resilient Design

- Sandy Beach Park Club, Grand Island
- Ellicott Creek Park, Tonawanda
- Hyde Park Lake, Niagara Falls
- Tiff Nature Preserve, Buffalo
- Buffalo River — *17 projects, 2 miles of shoreline*
- Little Beaver Island (Beaver Island State Park), Grand Island
- Athol Springs, NY\* (hamlet of Hamburg)
- Niagara River Islands\*\* (Frog Island, Motor Island, Strawberry Island)

*\*US Army Corps of Engineers, Buffalo District project*

*\*\*New York Power Authority projects, in partnership with NYS Dept of Environmental Conservation*





# VARIOUS LIVING SHORELINE RESTORATION PROJECTS







**Pre-Restoration**



**Post-Restoration**

# **HYDE PARK LAKE LIVING SHORELINE PROJECT**

**NIAGARA FALLS, NY**





Pre-Restoration



Post-Restoration

# HYDE PARK LAKE LIVING SHORELINE PROJECT

NIAGARA FALLS, NY





# USACE BUFFALO DISTRICT ATHOL SPRINGS REVETMENT PROJECT ROUTE 5, HAMBURG NY

PHOTOS COURTESY OF USACE BUFFALO DISTRICT



MATURE TREES REMAIN

UPLAND ZONE

TRANSITION ZONE

AQUATIC ZONE

BARRIER ROCK REEF

# A LIVING SYSTEM

## ANATOMY OF THE HABITAT COVE

High winds, waves, and boat wakes impact this shoreline continuously. These impacts cause accelerated erosion and a loss of critical shallow water habitat. To protect the shoreline, areas of severe erosion were identified and transformed into vibrant and self-sustaining habitat coves. Barrier rock reefs were installed in the water to lessen the wave energy and the calm water areas behind these structures created more suitable conditions for ecological restoration. Shoreline habitats can also be referred to as the 'ribbon of life' because it is estimated that 90 percent of all lake and river life is born, raised, or fed along the shorelines of water systems. The aquatic, transition, and upland zones are all critical components of a healthy shoreline. In addition to the creation of these three shoreline zones, woody debris such as logs and branches were added to enhance the in-water habitat. These features create resting and feeding grounds for water birds and fish, and are an important source of nutrients for microorganisms.



*Beneficial  
Rease*

The Emerald Ash Borer Beetle (EAB) is responsible for the decline of many ash trees in our region and across the country. EAB-infected ash trees found on-site were harvested and reused along the shoreline to improve shoreline environments and protect them from water's erosive forces.

## LITTLE BEAVER ISLAND SHORELINE RESTORATION PROJECT

GRAND ISLAND, NY

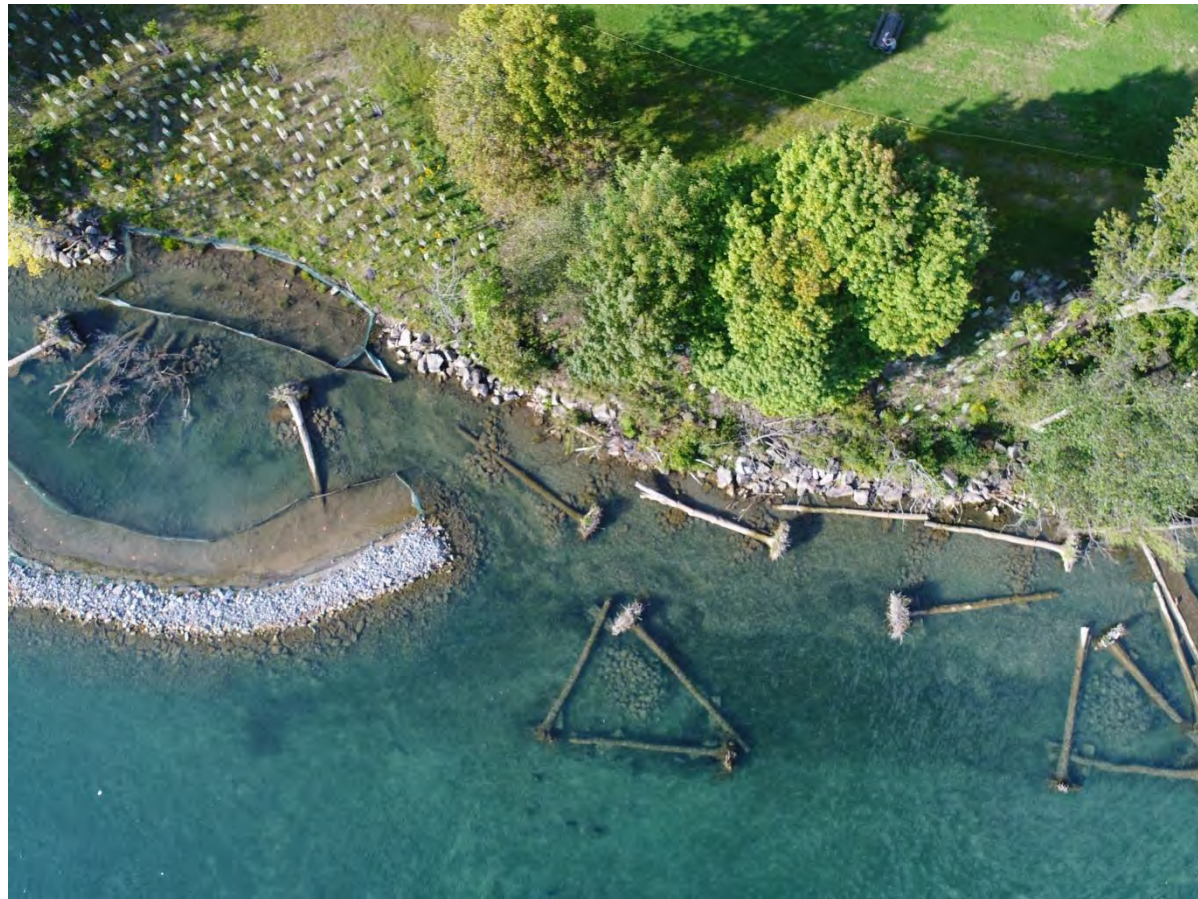




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