

2015-2016 Small Grants Program Project Summaries

1. **Project Title:** Improving Coastal Resilience and Community Stewardship on Grand Island

Subrecipient: Buffalo Niagara Riverkeeper

Project Description: For more than two decades, Buffalo Niagara RIVERKEEPER® (Riverkeeper) has led the regional effort to safeguard Western New York's waterways for present and future generations with the desire to restore and protect our desperately polluted Buffalo River. The Niagara River Riparian Restoration Program (NRRRP), led by Riverkeeper, is an initiative currently underway that will implement several living shoreline projects throughout the Niagara River Greenway over the next two years. The goal of these projects is to demonstrate that stabilization of eroding shorelines is possible through soft and bioengineered techniques that prioritize the provision of nearshore and riparian habitat.

Riverkeeper is working to link its NRRRP program with the Town of Grand Island to create and implement an education and outreach program, building a much-needed constituency of community-based stewards. Specifically, these efforts focus on two key outreach areas: coastal landowners and municipal representatives. Riverkeeper's goal is to provide targeted outreach and education about the benefits of living shorelines and riparian buffers to landowners in order to improve best management practices along Grand Island's Niagara River shorelines, thus increasing coastal resiliency within the community. The second outreach component targets municipal representatives on Grand Island, working with the Town to develop a strategy for increased living shoreline and riparian buffer implementation across the island. Through this project, a field assessment of opportunities for living shoreline implementation will take place along publically-owned land on the island's western coast. All of the efforts completed under this grant will support the completion of a shoreline restoration project to be implemented through the NRRRP program in 2016.

In addition, Riverkeeper is using a portion of the grant funds to print and distribute a landowner stewardship guide to the West River Parkway residents and Town officials, based in part on the outcome of the Grand Island outreach efforts. This guide is a key long-term outreach tool for the region.

2. **Project Title:** North Pond Resiliency Project

Subrecipient: Oswego County Soil and Water Conservation District

Project Description: The goal of the North Pond Resiliency Project is to enhance the resiliency of a coastal community in response to shoreline change affecting the North Pond Inlet and the coastal barrier between Lake Ontario and North Pond. Enhanced resiliency will be achieved through application of ecosystem-based management (EBM) principles and expanded knowledge of the causes and impacts of shoreline change. That knowledge will guide science-based decisions by public officials and resource managers and form the basis for development of new EBM-based policies and recommendations for the North Pond barrier-pond ecosystem, including recommendations for development of an Inlet Management Plan and an assessment of dune restoration outcomes and needs, for endorsement by the Town of Sandy Creek, State of New York, and other stakeholders. Findings and recommendations applicable to resource management initiatives in other Great Lakes locations will be developed.

Project methods build on the results of numerous previous research and planning initiatives concerning the Eastern Lake Ontario Dune Area. A management question, literature review, and interview procedure successfully developed for the ELODA reports and studies cited below will be identified. That procedure will involve assembly and review of existing sources of information, including remote sensing imagery; identification and involvement of stakeholder groups; a public meeting in the Town of Sandy Creek; on-site reconnaissance; substantial GIS mapping; and interim and final report preparation.

Shoreline change analysis focused on the inlet and coastal barrier will be conducted with respect to: 1) long term change based on historical aerial photography and existing maps that precede available photography; 2) recent change based on available orthoimagery; and 3) potential topographic volumetric change based on LiDAR data and prior topographic mapping data. A long baseline of shoreline change would be based on historic aerial photography potentially reaching back to the late 1930s and progressing at approximately 10 year intervals. Older photography would be scanned and registered to current orthoimagery. Existing maps predating available aerial photography will be evaluated for extending the time record for inlet location. More recent orthoimagery would be assessed to create a series of high accuracy shorelines (NYS GIS: 1994, 2003, 2006 and 2011; USDA: 2004, 2006, 2008, 2009, 2011, 2013). Shoreline sets from both long term and more recent sources would be used to calculate change using existing methods and software (e.g., Digital Shoreline Analysis System (USGS)). Availability and application of recent LiDAR data sets will be evaluated to provide potential volumetric change analysis, additional shoreline change references, and validation metrics (USACE: 2011; Leonard Jackson Associates, 2008; Oswego County, 2007). Data analysis would use available software and methods to determine shorelines and volumetric change (e.g. Fusion (USDA), ERDAS Imagine (Intergraph) and ArcGIS (ESRI)). The end result of these analyses will be characterization of shoreline dynamics in the NPPA with an assessment of the extent of sand mobilization and identification of areas of significant progressive change.

3. **Project Title:** Seiche-induced Erosion in Lake Erie

Subrecipient: Research Foundation for the State University of NY – Stony Brook

Project Description: Global climate change consequences appear in forms of storm intensification and sea level rise in the coastal areas. The Great Lakes which contain about 21% of the world surface fresh water and are invaluable natural and recreational assets primarily to the Great Lakes coastal communities and also to the US and Canada, are suffering from the global warming consequences, as well. One of the ongoing problems in the coastal Great Lakes is beach erosion which would accelerate as the result of storm intensification and water level rise. Among the Great Lakes, Lake Erie is the fourth largest in surface area and the smallest in volume and shallowest lake. Because of its shallow depth, Lake Erie demonstrates a unique free water level fluctuations pattern known as seiches, triggered by passing storms. The stronger the storms are the more pronounced seiching oscillations will become raising the water levels along the affected shore. The seiche itself, therefore, can be a source of coastal flooding and aggravate erosion in the Lake Erie coastal areas. Such flooding can potentially contribute to both beach and bluff erosion and would need to be considered in the coastal planning and management processes for building resilient coastal communities.

This project aims to evaluate the contribution of seiche and seiche-induced flooding and coastal erosion in the New York State's Lake Erie coastal areas. The results of this study can potentially be generalized to the rest of the Lake Erie shoreline in other states. A training component is also included.

One or two major storms are selected through extreme event analysis methods and simulated using a coupled storm surge and wave modeling suite. The coupled model needs wind and pressure fields as input. The wind and pressure fields for each storm are developed using the atmospheric data recorded at the meteorological stations around the lake. The lake bathymetric information is available from NOAA, USGS and the US Army Corps of Engineers. The coupled storm surge and wave model provide lake-wide wave and water level time series. The model output time series for water level is used both with seiche and without seiche as input to a morphological model predicting the beach profile evolution during the storms and the morphology responses are compared. The findings of the project will help resilient coastal community planning and design.

4. **Project Title:** Wayne County Shoreline Resiliency Restoration and Protection of Sewer Resource Management for the Village of Sodus Point

Subrecipient: Wayne County Soil and Water Conservation District

Project Description: The Southern Shoreline of Lake is made up of many communities that depend on varying aged infrastructure and shoreline protection planning to continue to protect the ancient waters of the Great Lakes. The Village of Sodus Point is a small coastal community made up of estimated 900 residents in accordance with the 2010 US Census. This small village is in partnership with the Federal Government to protect the inlet of Sodus Bay through reservation of a strip of land to host a base station for the US Coast Guard and Wayne County Sheriff's department and to allow public access and viewing of the open waters. Part of the partnership includes roughly 1250' LF of access to the Great Sodus Bay as well as 900' LF on the Lake Ontario. This is a very narrow strip of land between Wickham Boulevard's pavement and Great Sodus Bay owned by United States of America but the Village has maintained this property for many decades as part of the right of way agreement. Along this right of way over the years, the County has assisted the Village with installation of protection on the Bay-side for about 750' LF for protection of the US Coast Guard and Wayne County Sheriffs stations but this left about 500' LF of coast exposed to the elements. This project became a critical issue for the Village of Sodus Point due to the recent Coastal Property assessment for infrastructure management. In the last 4 years, the increase in high flow weather events, extreme wave action and increased iced cover on these shallow sandbar areas has caused roughly 5-7' LF of bank erosion along the 500' LF of unprotected coastline with the rate of erosion of 1-2' LF per year. Approximately 15' LF from the current eroded bank, there lay a sewer main that supports 1/3 of the residents of the Village, 4 major trees that are close to utility lines and about 20' LF from a roadway to one of the South Shore, Lake Ontario Public Beaches. Therefore utilizing an ecosystem based management approach, the Wayne County Soil & Water Conservation District and the Village of Sodus Point have partnered to strengthen wastewater infrastructure to reduce vulnerability to flooding, drought, and other extreme weather events. This will mitigate future potential for sewer compromises, leading to spills to contaminate the near shore waters of Lake Ontario.

The goal of this project is to create shoreline protection that will be sustainable for many years for resiliency and reduction of sediment into the open waters and mitigation for future sewer and utility infrastructure compromises affecting water quality. With a rate of loss of the shoreline currently at 1-2' per year, it is important to be able to implement practices that will reduce this loss to a maintenance level and preserve the natural existing bank. The project encompasses the continuation of shoreline protection through various textiles and natural vegetation to provide deep root control of the shoreline. Currently the rip-rap from the Wayne County Park is holding the bank correctly. This project would include a combination of large 3'-4' rocks as toe protection, along with several other sized #2 and #3 sized rocks to manage the constant water changes, ice formation retractions and constant wind. A layered structure will provide protection and suspension of the changes in earth over time along with the use of US Fabrics Inc. 160NW will be laid on the bottom and against the rocks on the shore side to hold the material from being washed out through the rocks. Then the void between the rock protection and shore will be restored with gravel and topsoil to be seeded and planted with decorative woody plants, similar to materials used in rain gardens for better stormwater controls of surface runoff. The remaining areas will be seeded with a conservation mix for various root growth and coverage.