Teaming Up to Clean Up Lake Erie Beaches

- Lake Erie Watershed Protection Alliance (LEWPA)
- U.S. Environmental Protection Agency
- Ecology and Environment, Inc.
- NYS Department of Environmental Conservation
- NYS Office of General Services

Joanna Panasiewicz LEWPA Coordinator

Jim Taravella, P.E., ENV SP Chief Civil Engineer Ecology and Environment, Inc.











Lake Erie Watershed Protection Alliance









2009 Cattaraugus Creek Floods Instigate Collaboration

LEWPA Board of Directors includes representatives from each county in:

- Local government
- Regional government
- Soil & Water Conservation District



Prepared in cooperation with the Federal Emergency Management Agency

Flash Floods of August 10, 2009, in the Villages of Gowanda and Silver Creek, New York



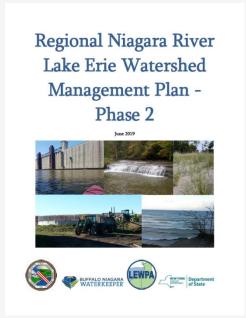
Scientific Investigations Report 2010-5259

U.S. Department of the Interior

Nine-element Watershed Management Plan for the Niagara River/Lake Erie Watershed

- Currently in Phase 3:
 - to assess completed water quality sampling by USGS and LEWPA
 - o develop pollutant reduction goals
 - conduct stream assessments
 - determine implementation projects to achieve pollutant reduction targets.
- This will help direct water quality project implementation funds







Department of State



Department of Environmental Conservation

NYS Environmental Protection Fund

Example implementation projects include:

- Streambank restoration
- Hydroseeding and planting buffers
- Invasive species management and prevention
- Project feasibility studies
- Green infrastructure

24.5 acres of land-based invasive species management		6,414 tons of		14 watershed signs installed	
		sediment prevented from reaching	3,565 people educated		
85.5 acres of stormwater treated annually		waterways		6 feasibility studies completed	
6,422 pounds of phosphorus prevented from reaching waterways	501 boats inspected for aquatic invasive species			12,836 pounds of nitrogen prevented from reaching waterways	
	7	47.4 acres hydroseeded			
5,121 feet of stream bank and road bank stabilized			2,300 feet of streamside vegetated buffers planted		

Lake Erie Beach Projects

- Point Gratiot Park
- Green infrastructure projects were designed by Ecology and Environment, Inc. to capture and treat stormwater runoff
- Commissioned by NYS Department of Environmental Conservation
- Funded by NYS Office of General Services
- The Lake Erie Watershed Protection Alliance was able to accept funding from the U.S. Environmental Protection Agency to implement construction
- Lake Erie Beach in Evans, NY (Erie County)
- Point Gratiot Beach in Dunkirk, NY (Chautauqua County)

Lake Erie Beach Closures

- *E. coli* is used as an indicator of potential harmful bacteria
- Outfalls near the beaches can carry contaminated runoff to beach areas



Lake Erie Beach:

- Closed 160 times between 2008 and 2016 due to high E. coli
- Closed an average 18% of season from 2011-2014

Point Gratiot Beach:

- Up to 28 closed days per season since 2008
- Closed between 13% and 40.5% of each season 2008-2014

Discussion Outline

- ►Introduction to Rain Gardens & Bioswales
- ➤ Rain Garden/Bioswale Site Evaluation & Design
- ➤ Pilot Projects
 - Point Gratiot Park, Dunkirk, NY
 - ❖ Lake Erie Beach, Evans, NY
- Closing Comments
- > Q&A

Introduction to Rain Gardens & Bioswales



Image Source: Fairfax County, VA



Image Source: Soils.org

Introduction to Rain Gardens & Bioswales Rain Gardens

What is a Rain Garden? Nature's Water Filter: Rain gardens are shallow landscaped depressions that capture, clean and absorb stormwater runoff from roofs, parking lots and roads. Native plants do not require fertilizer Runoff is collected from paved and help filter pollutants. and other hard surfaces and directed into the garden. Native plants provide food and habitat for birds, butterflies and other pollinators. A depression in the earth is filled with a mixture of A typical rain parden sand, topsoil and compost is between six and that filters water. nine inches deep.

Image Source: The Nature Conservancy

- Collect stormwater runoff from small areas
- Promote sediment removal through settling
- Infiltration of runoff, decreased discharge to streams/sewers
- Increase in infiltration through native plantings
- Short-term ponding

Introduction to Rain Gardens & Bioswales

Bioswales/Vegetated Swales

- Convey stormwater runoff away from impervious surfaces
- Promote sediment removal through settling
- Infiltration of runoff, decreased discharge to streams/sewers
- Increase in infiltration through native plantings
- Decrease flow velocities, erosion

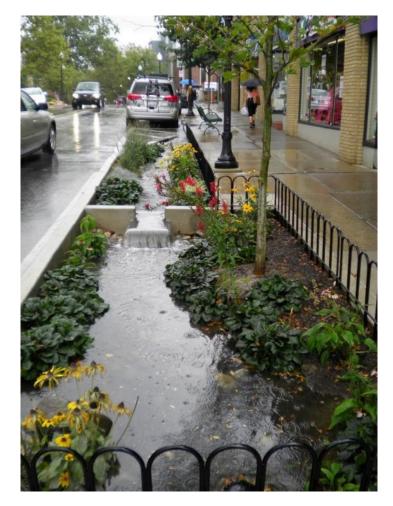


Image Source: Borough of State College, PA



Element 3) Plant Selection

Element 4) Maintenance

Element 5) Design Resources

Element 1) Visual Site Assessment

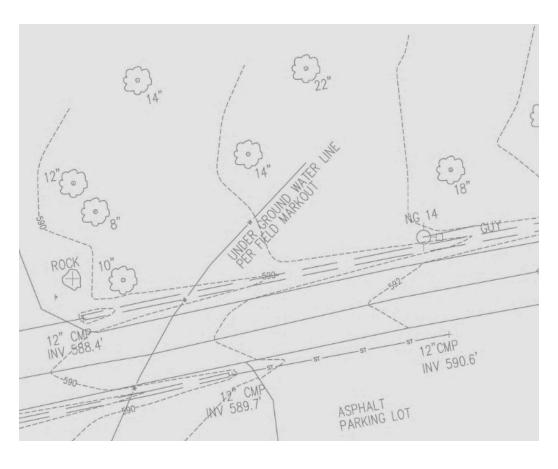
Element 2) Topographic Survey and Soils Investigation



Site Visit



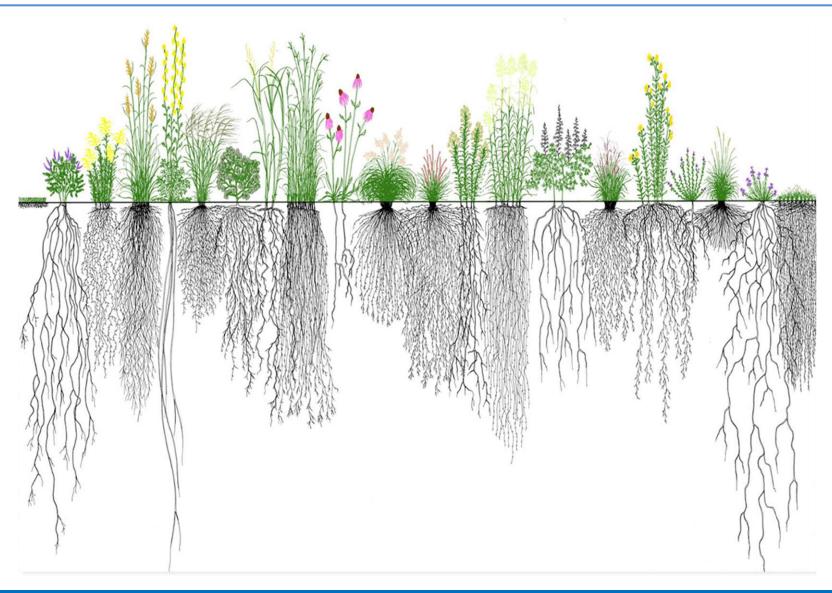
Topographic Survey & Soils Investigation







Plant Selection



Maintenance

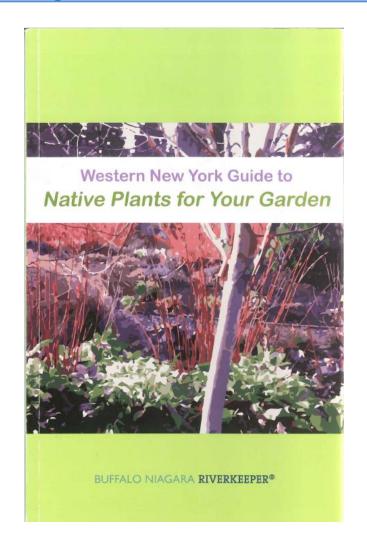






- ➤ Water Plants (until establishment)
- > Weeding
- > Pruning
- > Cleanout Sediment Accumulation
- > Do Not Mow

Design Resource





New York State

Stormwater Management Design Manual

January 2015

Originally Prepared by: Center for Watershed Protection 8391 Main Street Ellicott City, MD 21043

Updated by: New York State Department of Environmental Conservation 625 Broadway Albany, NY 12233

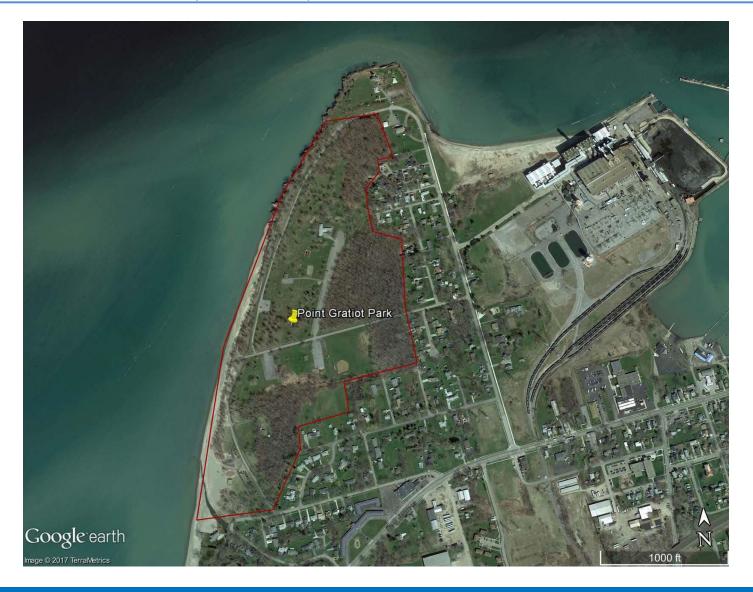


Andrew M. Cuomo, Governor

Joseph Martens, Commissioner

Pilot Projects

Point Gratiot Park, Dunkirk, NY



Site Evaluation & Design

- Site visit conducted on November 9, 2016
- Four areas identified for potential green infrastructure implementation:
 - 1) Park Drive Swale
 - 2) West Oak Street Swale
 - 3) Asphalt Path

Site Evaluation & Design

- Field verification of drainage patterns
- Site visit on April 6, 2017 during rain event
 - On-site soils saturated
 - 0.64 inches over a 12-hour period



Existing Park Drive swale

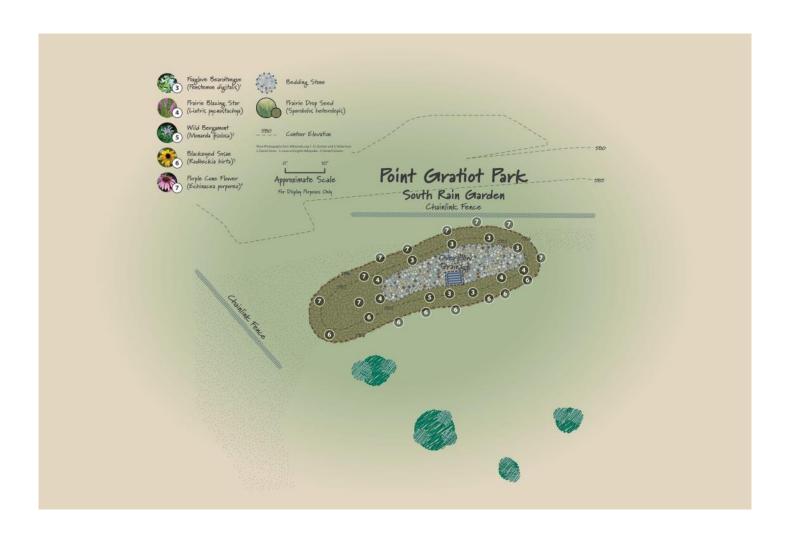
Site Evaluation & Design – Area 1: Park Drive Swale

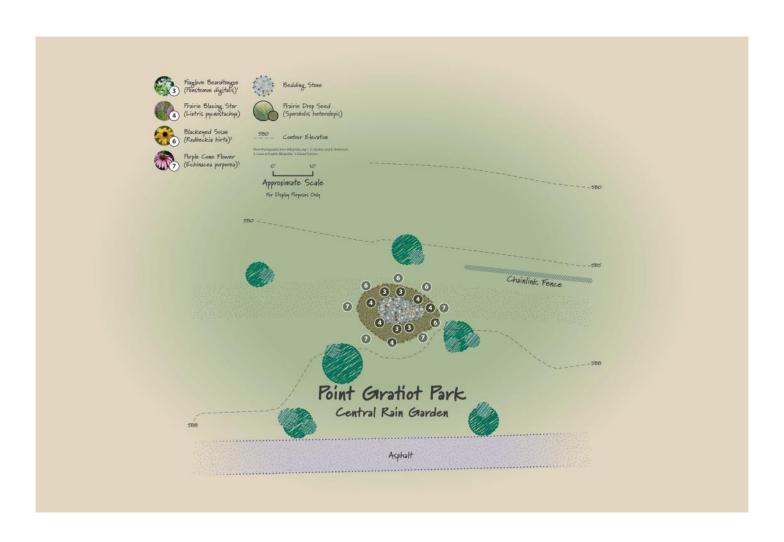


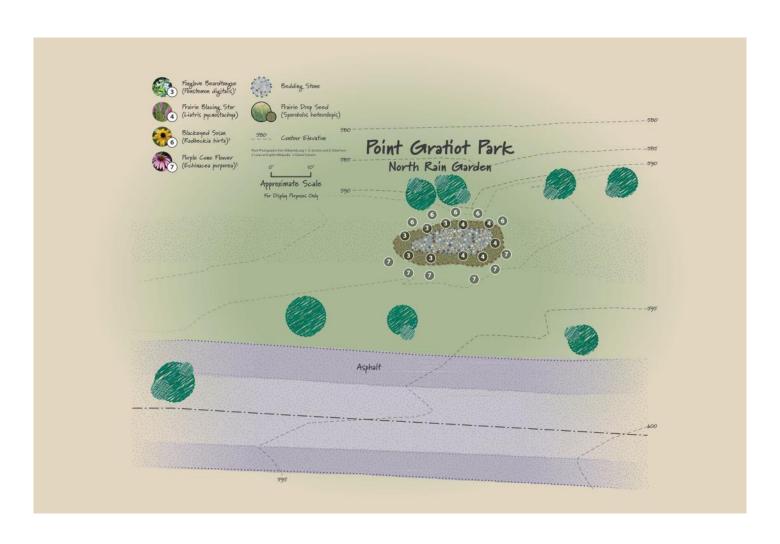












Site Evaluation & Design – Summary

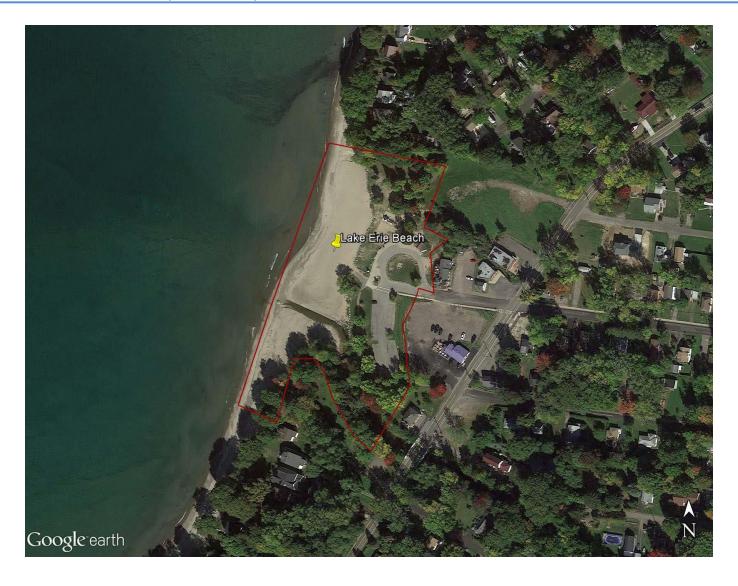
- Primary Benefits
 - > 25-50% TSS Removal
 - > 40-60% Nitrogen Removal
 - >75% Fecal Coliform Reduction
- Additional Benefits
 - > Reduced Beach Erosion
 - Decreased Discharge Velocity
 - Increased Pervious Area
 - > Aesthetic Improvement





Pilot Projects

Lake Erie Beach, Evans, NY



Site Evaluation & Design

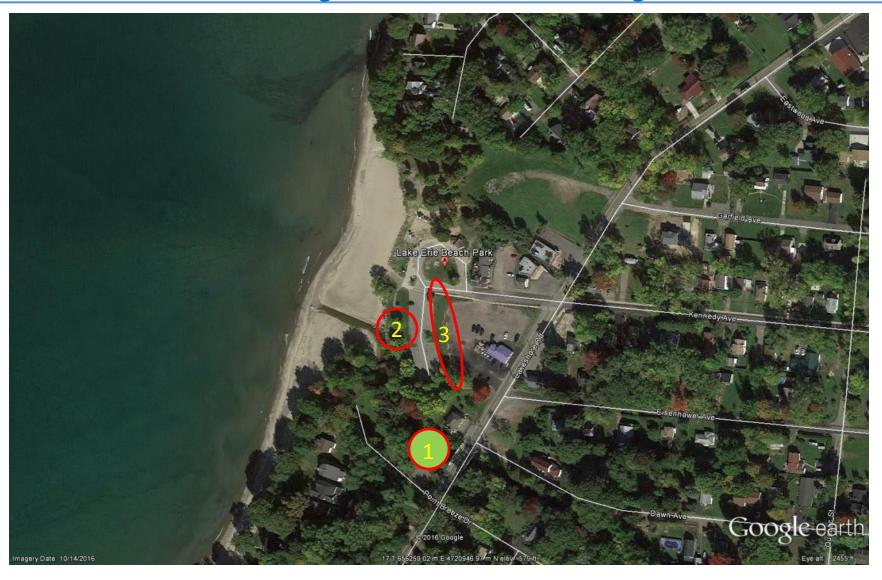
- Site visit conducted on November 9, 2016
- Four areas identified for potential green infrastructure implementation:
 - 1) South Parking Lot
 - 2) Muddy Creek Walkway
 - 3) Main Parking Lot Swale

Site Evaluation & Design

- Field verification of drainage patterns
- Site visit on April 6, 2017 during large rain event
 - On-site soils saturated
 - Approximately 0.75 inches of rain over a 12-hour period

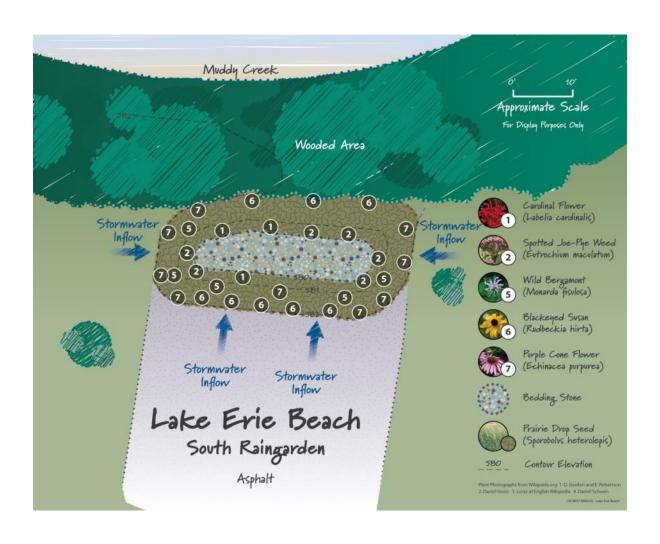


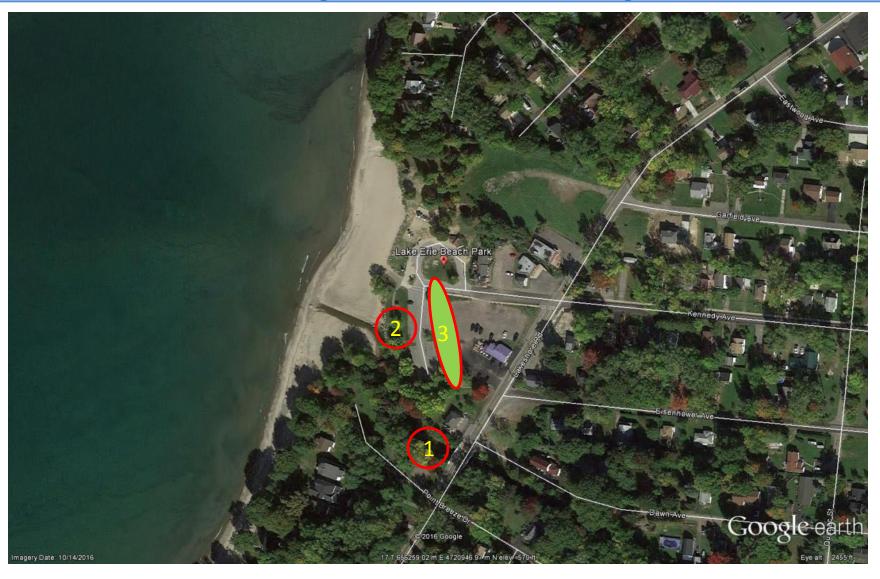
Main Parking Lot Swale



















Site Evaluation & Design – Summary

- Primary Benefits
 - > 25-50% TSS Removal
 - > 40-60% Nitrogen Removal
 - >75% Fecal Coliform Reduction
- Additional Benefits
 - ➤ Decreased Discharge Velocity & Volume
 - > Increased Pervious Area
 - > Aesthetic Improvement





Closing Comments



Image Source: Fairfax County, VA



Image Source: Soils.org

Closing Comments Rain Gardens & Bioswales



Image Source: Sarah A. White, Nursery Extension Specialist, Clemson Extension Service

- Collect stormwater runoff from small areas
- Promote sediment removal through settling
- Infiltration of runoff, decreased discharge to streams/sewers
- Increase in infiltration through native plantings
- Convey stormwater runoff away from impervious surfaces
- Decrease flow velocities, erosion

Closing Comments

- Improves Water Quality
- Enhances Aesthetics
- Increases Biodiversity
- Opportunity to Educate the Public



Image Source: University of California, Santa Barbara

Q & A

Questions from the Audience



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