Niagara Greenway Habitat Conservation Strategy
Phase I

FINAL REPORT

January 2013

Prepared for:

Greenway Ecological Standing Committee

Prepared by:

Buffalo Niagara RIVERKEEPER®

BUFFALO NIAGARA RIVERKEEPER®

ACRONYMS:

AOC- Area of Concern

APCW- Ability to Produce Clean Water

ARA- Active River Area

BAP- Biological Assessment Profile

BNR- Buffalo Niagara RIVERKEEPER®

BSC- Bird Studies Canada

BUI- Beneficial Use Impairment

CAP- Conservation Action Plan

CSO- Combined Sewer Overflow

CWCS- Comprehensive Wildlife Conservation Survey

DEC- Department of Environmental Conservation

EAV- Emergent Aquatic Vegetation

ENE- Ecology & Environment

EPA- Environmental Protection Agency

GESC- Greenway Ecological Standing Committee

GIS- Geographic Information System

GLFC- Great Lakes Fishery Commission

HERF- Habitat Enhancement and Restoration Fund

HIP- Habitat Improvement Project

IBA- International Bird Area

LE CAP- Lake Erie Biodiversity Conservation Strategy

LIDAR- Light Detection and Ranging

LO CAP- A Binational Biodiversity Conservation Strategy for Lake Ontario

LWRP- Local Waterfront Revitalization Plan

NHP- Natural Heritage Program

NOAA- National Oceanic & Atmospheric Association

NPS- Non-point source pollution

NRCS- Natural Resources Conservation Service

NRDC-Natural Resource Defense Council

NWI- National Wetland Inventory

NYPA- New York Power Authority

OMOE- Ontario Ministry of Environment

PWL- Priority Waterbodies List

RAP- Remedial Action Plan

RIBS- Rotating Integrated Basin Study

SAV- Submerged Aquatic Vegetation

SGCN- Species of Greatest Conservation Need

SVAP- Stream Visual Assessment Protocol

TAC- Technical Advisory Committee

TNC- The Nature Conservancy

TU- Trout Unlimited

USFWS- United States Fish & Wildlife Service

USDA- United States Department of Agriculture

ACKNOWLEDGEMENTS:

Technical Advisory Committee
Ecology & Environment, Inc.
Greenway Ecological Standing Committee

Niagara Greenway Habitat Conservation Strategy – Phase I
FINAL REPORT

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PART 1. EXECUTIVE SUMMARY

The Niagara River region consistently scores "Poor" on water quality, habitat and wildlife indicators, yet it is not always clear exactly why, where or what could be done to improve habitat quality and ecosystem functionality in this region (CWCS, RAP, PWL/BAP, USDA Forest Service/APCW). What are the major biodiversity features that define the Niagara region and how healthy are they? What are the most significant threats? What are our major natural assets and best bet opportunities for conservation and restoration?

Without answers to these questions, the funds available for habitat protection and restoration may not be used wisely or sufficiently to meet the region's needs. How do we, in the near term, direct resources towards meaningful projects – projects that will provide the greatest payoff in improving regional habitat quality, ecosystem function and the ability of native fish and wildlife species and communities to thrive?

The purpose of this two-phased Niagara River Greenway Habitat Conservation Strategy is to answer some of these questions by using a Conservation Action Planning model to provide a scientifically-based, stakeholder-driven strategy for restoring healthy native fish and wildlife populations and habitats to our region. The CAP model has been used to assess Lake Ontario, Lake Erie, and the Niagara River on the Canadian side, and is seen by many as the logical next step guiding remedial action planning efforts beyond toxic contaminant cleanup. The CAP model provides a more focused analytic framework for evaluating habitat health and selecting conservation options, while also including a broader array of potential implementers such as municipal officials, park managers and citizen-based conservation groups.

In Phase I Buffalo Niagara RIVERKEEPER® worked with a technical advisory group to identify a suite of biodiversity features that define the Niagara River region, focusing on the river and tributary riparian areas within the Niagara River Greenway boundary. The biodiversity features selected were benthic and nearshore aquatic habitat, wetlands, woodlands, grass/shrublands, islands, and the Niagara Gorge as a unique feature.

In order to quantify the amount of each type of habitat in the river corridor, 2011 LIDAR imagery was analyzed at a 1-foot resolution (analysis and QA/QC provided by Ecology and Environment, Inc. See Part 2.) This analysis provided detailed information on habitat types bordering the Niagara River inland to 1,000 feet, and bordering the tributaries inland to 500 feet on each side. Thus, for example, natural cover in the Niagara River 1000-foot coastal area (including the perimeter of Grand Island) is made up of 1,243 acres or 5.6% wetlands; 1,846 acres or 8% woodlands; and 1,322 acres of 5.9% grass/shrublands. This adds up to 4,411 acres of natural cover or 19.8% of the Niagara River coastal area. Compared with goals of >80% of natural cover for coastal areas in the Lake Erie and Lake Ontario CAPs, this suggests a significant need for increasing natural cover along the river.

Using aerial image analysis, Phase I also allowed us to more strictly quantify the amounts of hard and soft shoreline in the river corridor and along each of the tributaries. Again, looking at the river's edge (58.7 miles) and the perimeter of Grand Island (27.5 miles), 60% is hardened with sheetpiling, riprap, concrete or other material, and 40% is soft, including natural vegetation and beach. These metrics allow us to refine our objectives and criteria for the Niagara River shoreline.

Both of these products contribute to the baseline data our region needs to assess restoration progress. The accompanying maps also allowed us to identify some potential opportunities for connecting habitats and softening shorelines. Some of these are described in Part 5.

To assess the quality and connectivity of biodiversity features within the Niagara River Greenway, RIVERKEEPER® began with objectives and indicators already identified by existing programs such as the Buffalo and Niagara River RAPs, the DEC's Comprehensive Wildlife Conservation Strategy, or the Rotating Intensive Basin Studies (RIBS) program. For example, one RAP delisting criteria is that the Niagara AOC benthic macroinvertebrate community structure should be nor worse than slightly impacted at selected depositional zones (RAP Stage 2 Addendum, Jan 2012). Benthic Assessment Protocol, or BAP scores, provided through 2010 RIBS sampling and through analysis of stream variables and trends (NYS Blueprint, 2011) predict that only 12% of AOC aquatic habitat is slightly impacted (all on Grand Island), with 88% moderately impacted. This begins to establish a benchmark against which to measure restoration progress. See Part 3.

A small amount of field work was undertaken in Phase 1 in order to assess aquatic connectivity, specifically the amount of Niagara River tributary streams free of barriers to native migratory fish. ENE examined all tributaries within the greenway up to and beyond the first impassable barrier to provide an inventory of 26 barriers, which were characterized by type, severity and potential mitigation measures. These barriers will be further evaluated in Phase 2 in terms of the amount of upstream aquatic habitat would become available with their removal, and the species that would benefit.

Many community stakeholders and experts contributed to Phase I of the Niagara Greenway Habitat Conservation Strategy. Besides the core team at RIVERKEEPER®—Kerrie Gallo, Margaret Wooster and Emily Sadowski—the project benefitted from the GIS and field work of Ecology and Environment, Inc. Several volunteer interns, including Aaron Feeney and Melissa Muth, contributed valuable GIS and research skills. Meetings with the Technical Advisory Group allowed us to make informed decisions on our selection of biodiversity features and indicators. Meetings with stakeholders—including town officials, natural resource and other agencies, conservation groups, universities and interested citizens—allowed us to assess the interest and capacity in the Niagara community for implementing habitat conservation and strategies at many levels—from local policy to site development.

PART 2. KEY OBJECTIVES AND TASKS

Objective 1: Compile and review existing datasets and literature

Tasks/Accomplishments

A. RIVERKEEPER® reviewed existing Niagara River Greenway-related GIS datasets for resolutions, geographic coverage limits and limitations, sources, and metadata. **(Attachment 1: Existing Greenway Habitat Data Review)** Identified data limits and gaps relative to information needs included:

- Coarse scale land use data (e.g., NOAA maps are based on older (2005) aerial photography at 30 m resolution)
- Limited geographic coverage (e.g., NYPA maps focus mainly on power project areas)
- Incomplete datasets on most indicators including shoreline conditions, aquatic vegetation, fish barriers, etc.
- Limited data on species presence, biological conditions and wetland locations

B. Over 180 documents were compiled, reviewed and developed into a sharable library of research and literature sources relevant to habitat and ecological function within the Niagara Greenway. **(Attachment 2: Bibliography)**

Objective 2: Establish and Consult with a Technical Advisory Group for Key Decisions

Tasks/Accomplishments:

RIVERKEEPER® convened a Technical Advisory Group of experts on regional habitat and species, hydrology, plant and wildlife biology, soils, and related programs including Niagara River Remedial Action Plans (Canada and US), the Greenway Plan, and the NYS Comprehensive Wildlife Conservation Strategy. The TAC met five times over the past 18 months to assess biodiversity features in the Niagara River Greenway (funded by the GESC) and, at a coarser scale, in the Niagara River Watershed (funded by EPA). **(Attachment 3: TAC Members)**

Objective 3: Define project scope, vision, primary stakeholders and outreach strategies

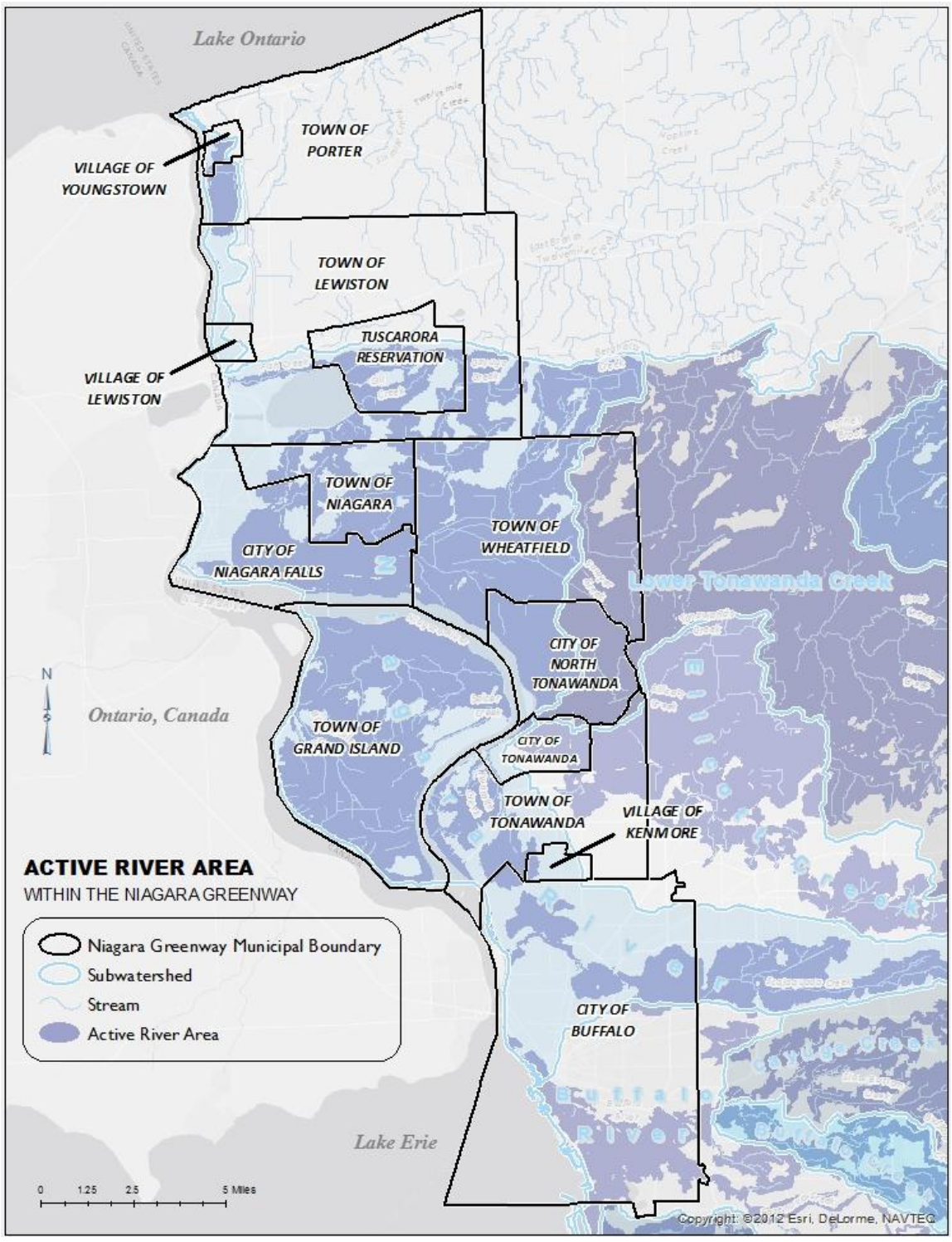
Tasks/Accomplishments:

A. Two regionally relevant models were used to help refine the project scope and vision:

- the TNC Conservation Action Plan model provided a strategic approach to identifying and quantifying indicators for biodiversity and ecological function
- the TNC Active River Area model focused the study area on the Niagara River, its tributaries, and the land dynamically and hydrologically connected with them—including floodplains, riparian wetlands, meander belts and material contribution areas.

B. A list of public stakeholders was identified and consulted through mailings, targeted meetings and one large public meeting. The focus was on municipal officials, agencies, and a range of Niagara River habitat/species interest groups. **(Attachment 4: Regional Stakeholder Meetings)**

C. Materials developed under Phase 1 of the project were shared more broadly via the Buffalo Niagara RIVERKEEPER® and Conserve Online websites. **(Attachment 5: Factsheet)**



The Active River Area includes 70,553 acres or 42% of the Niagara River Greenway area.

Objective 4: Evaluate and address GIS spatial data gaps for the NR Greenway

Tasks/Accomplishments:

A. The following existing datasets were used in mapping and analysis:

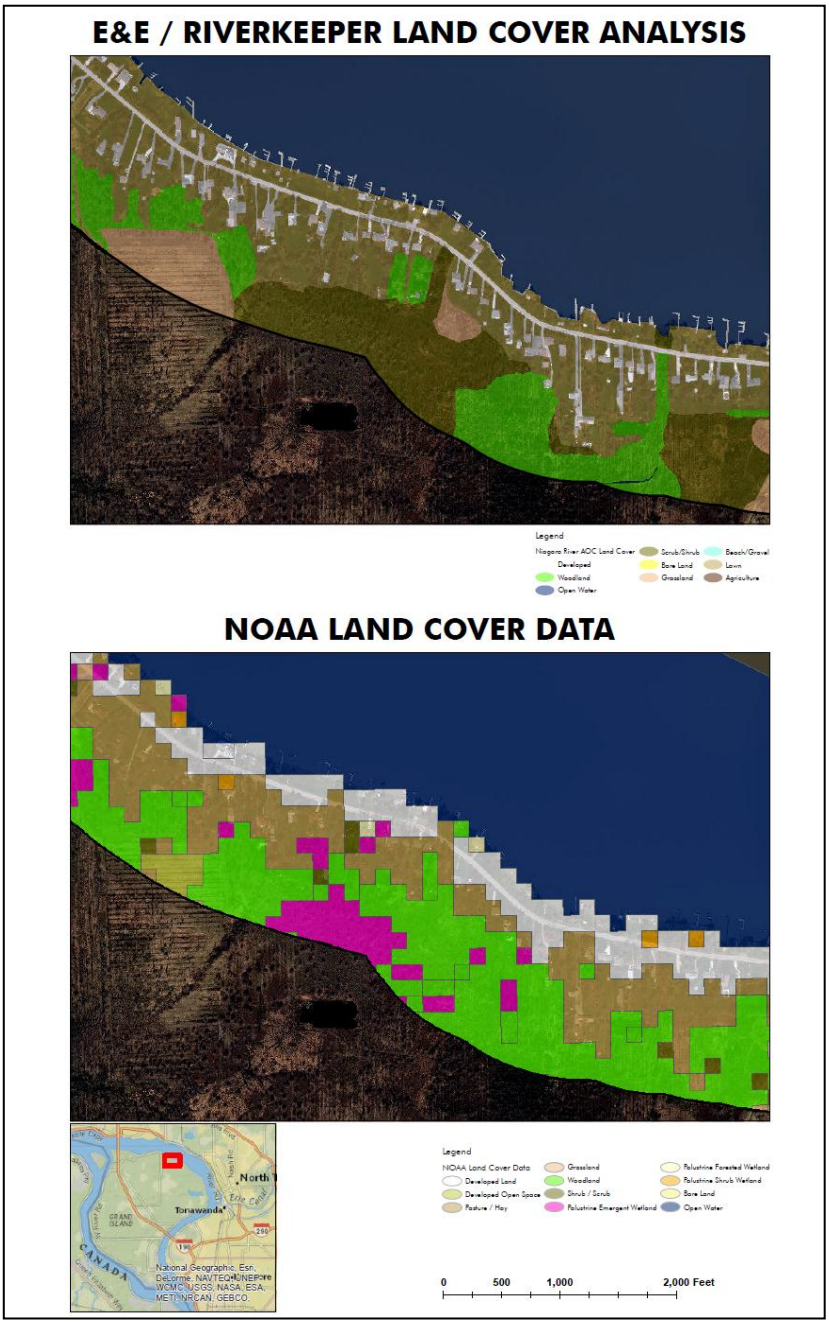
- NOAA Natural Land Use/Land Cover (for comparative purposes)
- DEC Dams
- NRCS Hydric Soils
- DEC/NWI Wetlands

By special permission:

- NYPA datasets (flow, SAV, shoreline condition, fish barriers, etc)
- Natural Heritage Program rare species and communities dataset
- Freshwater Blueprint (NHP/TNC)

B. The following data gaps were addressed through a contract with Ecology and Environment:

- Riparian area natural land covers were interpreted using LIDAR ("Light Detection and Ranging") analysis on 2011 aerial imagery flown at 1-foot resolution. Phase 1 Land cover analysis includes the Niagara River coastline to 1000 feet inland from mean high waterline; and 500 feet on either side of all main tributaries as far upstream as the Greenway boundary. **(Attachment 6: LIDAR Natural Land Cover Analysis & Attachment 7: Methodology)**
- Shoreline conditions—specifically whether "hard" or "soft"—were also interpreted from 2011 aerial imagery for the entire Niagara River and Grand Island coastlines and all tributaries within the Greenway. **(Attachment 8: Hard and Soft Shoreline & Attachment 9: Methodology)**
- NYPA and DEC fish barrier data was updated and field verified by ENE biologists in the field for a complete list and assessment of dams, culverts and other barriers to fish movement in Niagara River tributaries. **(Attachment 10: Fish Barrier Map and Table & Attachment 11: Methodology)**



Previously available land cover data were produced at a scale and resolution intended for region-wide analysis, rather than the specific site analysis required for this project. The low resolution of the existing data lacks the detail required to extract potentially small, discrete areas of protectable land. For example, given the focus on health of aquatic habitats, a riparian corridor of 50-100 feet could be completely missed because of the large pixel size of existing land cover data. Compared to the NOAA land cover data, BNR/ENE LIDAR analysis revealed 728 additional acres of wetland, 575 acres of woodland, and 1,041 acres of grass/shrubland in the area assessed. This truer and more accurate dataset is critical for the assessment of the Niagara Greenway to enable initial decision making at the desktop level.

Objective 5: Develop a set of biodiversity features which define the project area including specific species, natural communities and ecosystem function:

Tasks/Accomplishments

An inventory and beginning assessment of seven biodiversity features was developed for the Niagara River Greenway Active River Area. **(See Part 3)** Features include:

- Nearshore and Benthic Aquatic Habitat
- Wetlands
- Woodlands
- Grass/Shrublands
- Natural Areas
- Islands
- Unique area: the Niagara Gorge

The TAC provided formal input in developing this suite of features, especially on aquatic habitat and attributes and indicators related to flow and fish movement.

A public stakeholders meeting was held on September 25 for municipal and interest group input into the discussion of habitat indicators and potential threats and opportunities. **(Attachment 12: Public Meeting Powerpoint)**

Objective 6: Evaluate existing GIS datasets for effectiveness relative to finalized biodiversity features and begin to develop the maps and datasets needed to complete assessments in Phase 2.

Tasks/Accomplishments

A. RIVERKEEPER® began development of habitat health indicators based on amount, condition, connectivity/function and species/communities for selected Greenway biodiversity features. The following additional GIS maps and datasets were created:

- Actual and Predicted BAP scores
- Local Source Areas of Priority Contaminants in Fish and/or Mussel Tissue
- DEC/NWI Wetlands
- Wetlands by Class
- Natural Areas
- Protected Natural Areas

B. Additional GIS data needs will be outlined in the Phase 2 proposal to support the remainder of the CAP process.

Objective 7: Assess status and progress with GESC; secure funding to progress with Phase 2.

PART 3. BIODIVERSITY FEATURES – Draft

*** Basis for selecting features:**
- Represent the biodiversity of the Active River Area (ARA);
- Reflect existing state and regional conservation goals;
- Are viable or at least feasibly restorable;
- Are highly threatened

1. **Niagara River Open Water Aquatic Habitat: Nearshore and Benthic**
   Definition: Niagara River and lower tributary open water habitat including Nearshore: 6-foot depth to mean high water mark; and Benthic: >6 feet deep.

2. **Natural Areas**
   Definition: Land covers supporting terrestrial habitat connectivity and/or stream function within/continuous with the Greenway ARA.

3. **Wetlands**
   Definition: Emergent and woody wetlands in the Greenway ARA, including springs, seeps and headwater wetland areas.

4. **Woodlands**
   Definition: Deciduous, evergreen and mixed forest within the Greenway ARA.

5. **Grasslands/Shrublands**
   Definition: Meadows, early successional farmlands, selected capped landfills within the Greenway ARA.

6. **Islands**
   Definition: Natural and manmade islands, breakwalls and surrounding shallow water habitat.

7. **Unique Area: Niagara Gorge**
   Definition: Including six miles of cliffs, talus slope, bedrock shoreline and vegetated rim between the falls and the northern edge of the Niagara Escarpment at Lewiston.

BIODIVERSITY FEATURE 1: OPEN WATER AQUATIC HABITAT

Definition: Niagara River and lower tributary open water habitat including Nearshore: 6-foot depth to mean high water mark; and Benthic: >6 feet deep.

ATTRIBUTE 1: WATER/SEDIMENT (QUALITY)*

- Indicator 1: Benthic community health
- Indicator 2: Bioaccumulation of priority contaminants
- Indicator 3: Percent of impervious surface by sub-basin

ATTRIBUTE 2: PHYSICAL CHANNEL (CONDITION)

- Indicator 4: Channelization/hardened shoreline
- Indicator 5: Aquatic vegetation

ATTRIBUTE 3: FLOW or INTACTNESS OF ECOLOGICAL FUNCTIONS (LANDSCAPE CONTEXT)

- Indicator 6: Percent of tributary free of barriers to fish movement
- Indicator 7: Degree of artificial water level fluctuations

NESTED FEATURES:

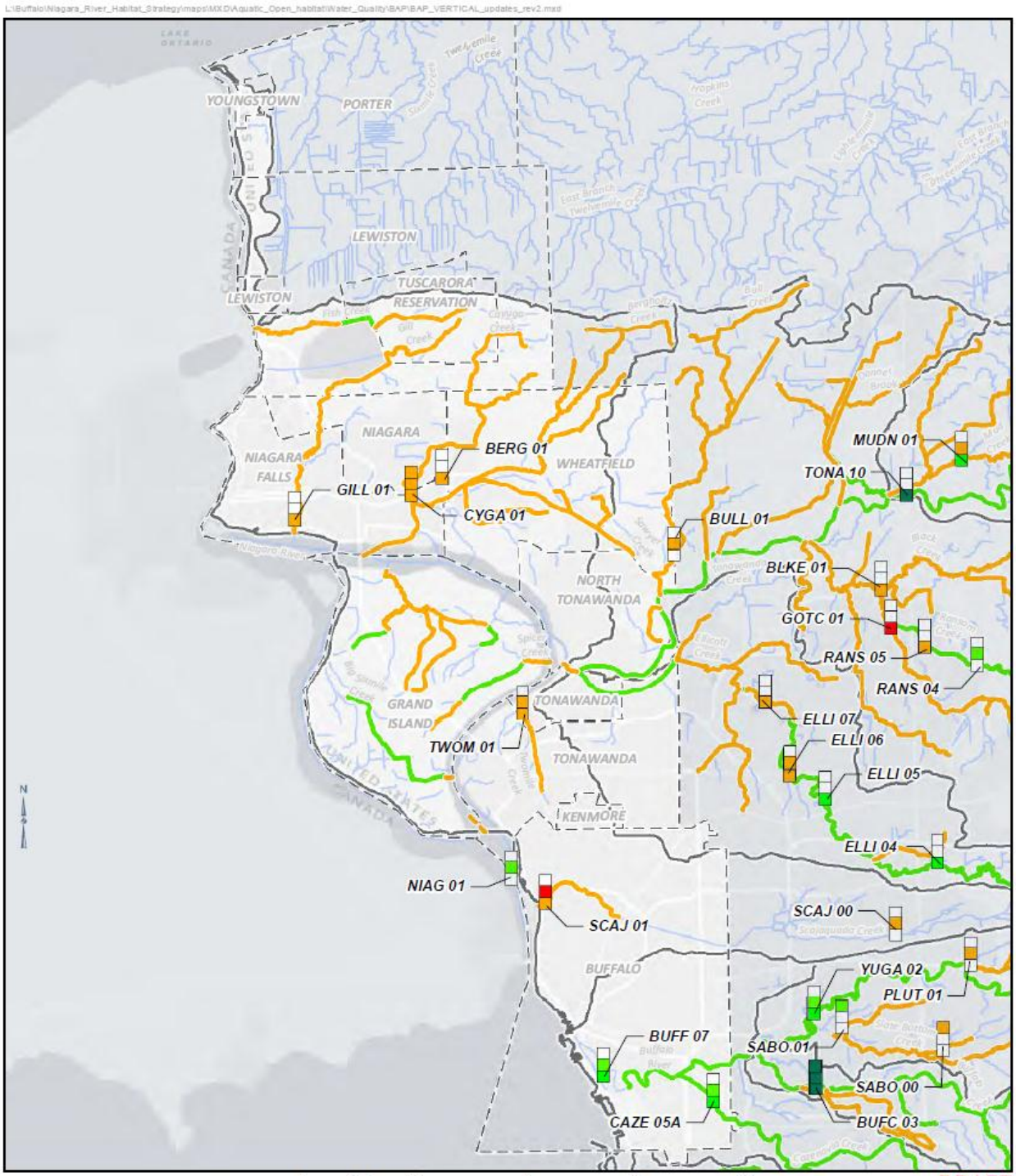
- Indicator 8: Population trends of native freshwater mussels
- Indicator 9: Population trends of native migratory fish that require tributaries for some part of their life cycle

** Additional basic water quality parameter data will be provided by BNR Riverwatch Program.*

OPEN WATER AQUATIC HABITAT

Key Attribute	Indicator	Poor	Fair	Good	Very Good	Greenway Rank & Data Source
QUALITY	1.Predicted BAP Scores- benthic community health	0-2.5	**2.5-5.0**	5.0-7.5	7.5-10	88% Fair, 12% Good (DEC; NYS Freshwater Blueprint)
"	2. Bioaccumulation of priority contaminants	TBD	TBD	TBD	TBD	10 known sites above safe levels (DEC/OMOE 2009)
"	3. % of impervious surface by sub-basin	TBD	TBD	TBD	TBD	Phase 2 (BNR/GIS)
CONDITION	4. Channel condition/shoreline hardening (LE CAP)	>40% hard	30-40%	**20-30%**	<20% hard	76% soft, 24% hard- entire Greenway coastal area (BNR aerial image analysis)
"	5. Presence of aquatic vegetation	TBD	TBD	TBD	TBD	Phase 2
LANDSCAPE CONTEXT	6. % of tributary free of barriers (culverts, dams) (LO CAP)	TBD	TBD	TBD	>80%	36% (BNR/GIS)
"	7. Degree of man-made water fluctuation	TBD	TBD	TBD	TBD	Phase 2
NESTED FEATURE: NATIVE MUSSELS	8. Population trends of native mussel species (LE CAP)	Absent - 2 spp	3-5 spp	6-15 spp	**>15 spp**	17 spp: population trend unknown (CWCS) (NHP and NYPA) Phase 2
NESTED FEATURE: NATIVE MIGRATORY FISH*	9. Population trends	Decreasing	TBD	Stable	Increasing	Phase 2

** Include as indicators Lake sturgeon, Northern pike and native fish population trends as data becomes available from US FWS and DEC.*


L:\Buffalo\Niagara_River_Habitat_Strategy\maps\MXD\Aquatic_Open_habitat\Water_Quality\BAP\BAP_VERTICAL_updates_rev2.mxd
LAKE ONTARIO
YOUNGSTOWN
PORTER
LEWISTON
TUSCARORA RESERVATION
LEWISTON
NIAGARA
NIAGARA FALLS
WHEATFIELD
NORTH TONAWANDA
TONAWANDA
GRAND ISLAND
TONAWANDA
KENMORE
BUFFALO
BERG 01
GILL 01
CYGA 01
MUDN 01
TONA 10
BULL 01
BLKE 01
GOTC 01
RANS 05
RANS 04
ELLI 07
ELLI 06
ELLI 05
ELLI 04
TWOM 01
NIAG 01
SCAJ 01
SCAJ 00
YUGA 02
PLUT 01
BUFF 07
SABO 01
SABO 00
BUFC 03
CAZE 05A
0 1.5 3 6 9 12
Miles
DRAFT
10 Aug 2012
Sampling Year
2010
2005
2001
Assessment
POOR
FAIR
GOOD
VERY GOOD
Niagara Greenway Municipal Boundary
Subwatershed
Stream
Stations are labelled with Station ID
Biological Assessment Profiles, Actual and Predicted
NIAGARA RIVER GREENWAY
SOURCES: BAP SCORES: NYSDEC RIBS STREAM BIOMONITORING PROGRAM REPORTS, 2000-2011
PREDICTED BAP SCORES: NY NATURAL HERITAGE PROGRAM AND TNC, FRESHWATER BLUEPRINT SERIES, 2011

BIODIVERSITY FEATURE 2: NATURAL AREAS

Definition: Land covers supporting terrestrial habitat connectivity and/or natural stream function.

ATTRIBUTE 1: ACREAGE (AMOUNT)

- Indicator 1: Percent natural land cover
- Indicator 2: Percent of protected natural area

ATTRIBUTE 2: SPECIES COMOPSITION/DIVERSITY (CONDITION)

- Indicator 3: Presence/absence of tracts of natural land > 50 acres.
- Indicator 4: Presence/pop. trends of animal species with large land requirements*

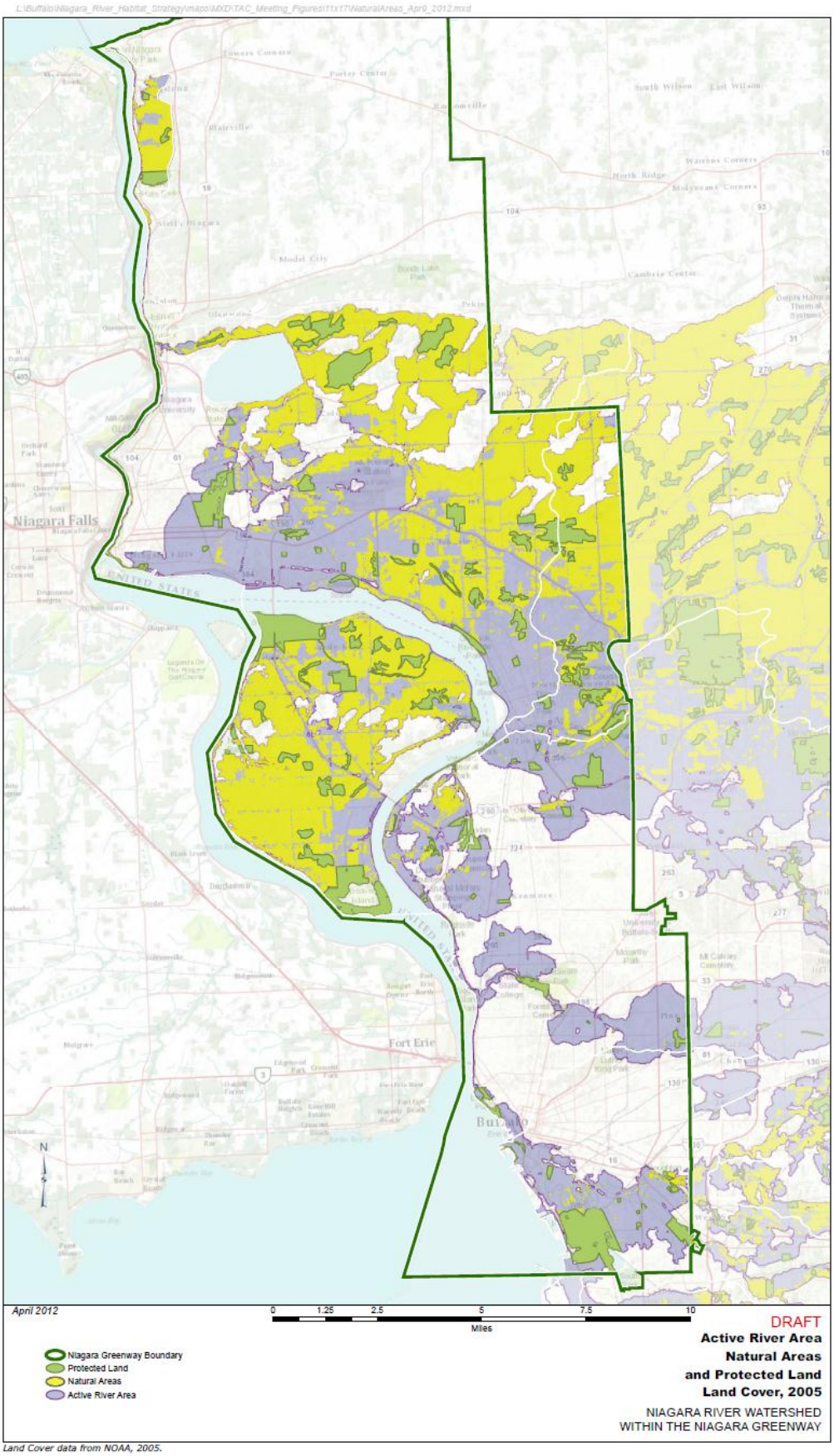
ATTRIBUTE 3: CONNECTIVITY (LANDSCAPE CONTEXT)

- Indicator 5: Road density in ARA

**Locations and trends for all protected plant and animal species and community will be in appendix materials for internal use only as we begin to prioritize key habitats for conservation.*

NATURAL AREAS

Key Attribute	Indicator	Poor	Fair	Good	Very Good	Greenway Rank & Data Source
AMOUNT	1. % of natural cover (LE CAP)	<20	**20-45**	>45-80	>80	27% (LIDAR—Greenway coastal areas only)
"	2. % of protected natural area in coastal area	TBD	TBD	TBD	TBD	19%
CONDITION	3. Presence/absence of tracts of natural land > 50 acres	TBD	TBD	TBD	TBD	Phase 2
"	4. Pops. of animals with large or diverse habitat requirements	Decreasing	TBD	Stable	Increasing	Phase 2
LANDSCAPE CONTEXT	5. Road density in ARA	TBD	TBD	TBD	TBD	Phase 2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Niagara Falls
Fort Erie
Buffalo
N
April 2012
0 1.25 2.5 5 7.5 10
Miles
Niagara Greenway Boundary
Protected Land
Natural Areas
Active River Area
DRAFT
Active River Area
Natural Areas
and Protected Land
Land Cover, 2005
NIAGARA RIVER WATERSHED
WITHIN THE NIAGARA GREENWAY
Land Cover data from NOAA, 2005.

BIODIVERSITY FEATURE 3: WETLANDS

Definition: Emergent and woody wetlands in or continuous with the ARA, including springs, seeps and headwater wetland areas.

ATTRIBUTE 1: ACREAGE (AMOUNT)

- Indicator 1: Acreage (percent) of wetlands
- Indicator 2: Amount/percent of state-regulated wetlands

ATTRIBUTE 2: SPECIES COMPOSITION/DIVERSITY (CONDITION)

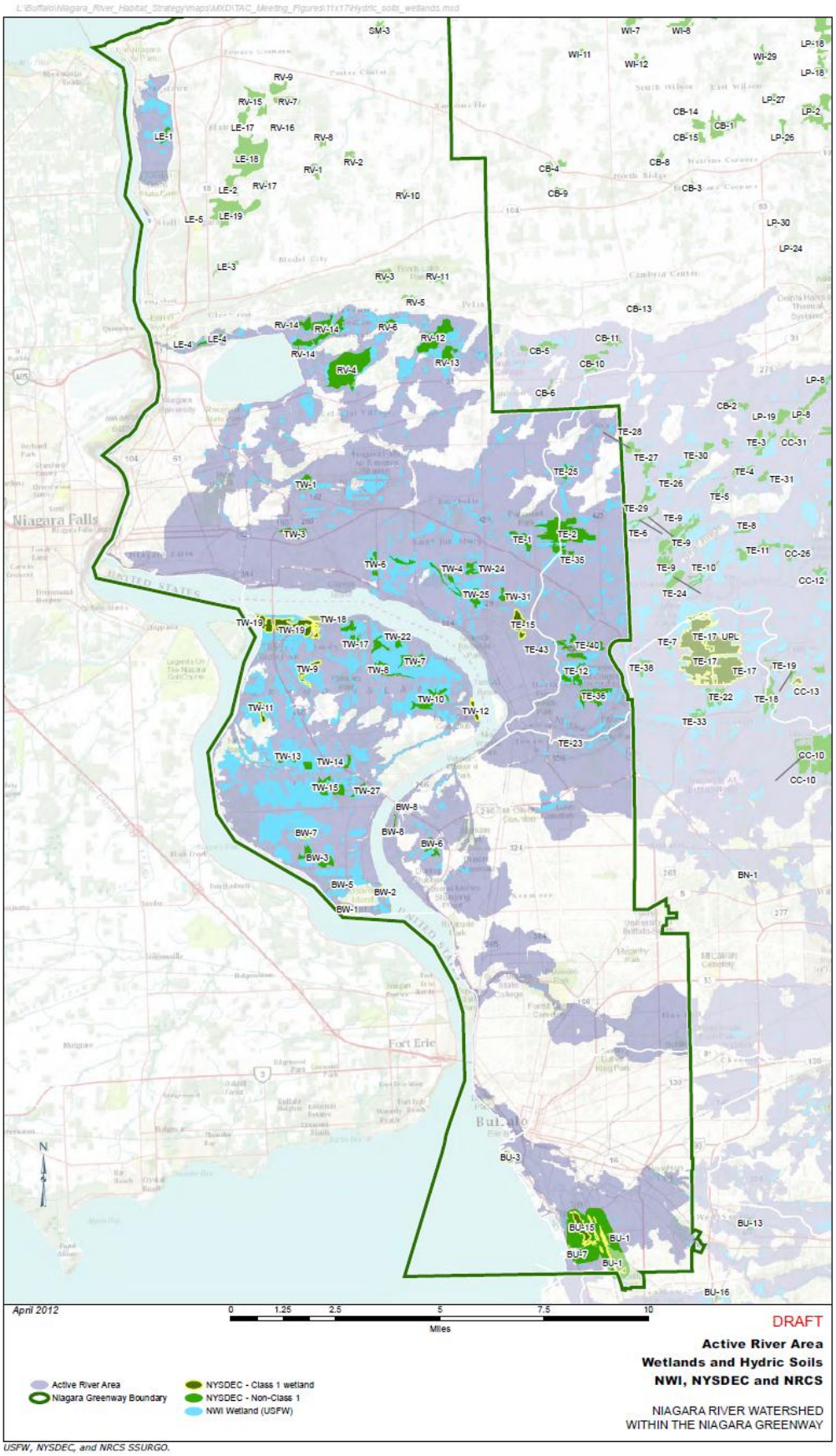
- Indicator 3: Presence/population trends of protected wetland herpetofauna and marsh birds
- Indicator 4: Presence of DEC Class 1 wetlands
- Indicator 5: Presence of rare plant species/communities

ATTTRIBUTE 3: CONNECTIVITY (LANDSCAPE CONTEXT)

- Indicator 6: Measure of change in extent/connectivity

WETLANDS

Key Attribute	Indicator	Poor	Fair	Good	Very Good	Greenway Rank & Data Source
AMOUNT	1. Acreage/% of wetlands	TBD	TBD	TBD	TBD	2,872 acres or 9% of Greenway coastal area has emergent, shrub or forested wetland cover (LIDAR). Need for ARA
"	2. Amount/% of state regulated wetlands	TBD	TBD	TBD	TBD	There are 59 state-regulated wetlands in Greenway ARA or 3,600 acres (5% of ARA) (LIDAR). Need for coastal area
CONDITION	3. Presence/trends of protected wetland animal species (or of indicator species)	**Decreasing**	TBD	Stable	Increasing	#/trends of protected wetland species: 18% stable/increasing #/trends of indicator herps: 3 #/trends of indicator marsh birds: 13 (CWCS, MMP, NYPA, NHP)
"	4. Presence of DEC Class 1 wetlands	TBD	TBD	TBD	TBD	11 Class 1 wetlands in Greenway ARA (C. R./DEC—note attributes)
"	5. Presence of rare plant species/ communities	Decreasing	TBD	Stable	Increasing	5 spp/communities
LANDSCAPE CONTEXT	6. Measure of change in wetland extent/ connectivity	TBD	TBD	TBD	TBD	Phase 2?



USFW, NYSDEC, and NRCS SSURGO.

BIODIVERSITY FEATURE 4: WOODLANDS

Definition: Deciduous, evergreen and mixed forest within the ARA.

ATTRIBUTE 1: ACREAGE OF RIPARIAN FOREST (AMOUNT)

- Indicator 1: Acreage of forest cover in coastal area and ARA

ATTRIBUTE 2: SPECIES COMMUNITIES/DIVERSITY (CONDITION)

- Indicator 2: Presence of protected forest plant species and communities
- Indicator 3: Populations of key indicator animal species

ATTRIBUTE 3: CONNECTIVITY (LANDSCAPE CONTEXT)

- Indicator 4: Measure of change in forest extent/ connectivity over time
- Indicator 5: Distance from roads

WOODLANDS

Key Attribute	Indicator	Poor	Fair	Good	Very Good	Greenway Rank & Data Source
AMOUNT	1. Acreage/% of forest cover in coastal area and AOC	TBD	TBD	TBD	>60% (LO CAP)	3,420 acres or 11% (LIDAR: coastal area only)
CONDITION	2. Presence of protected plant species or communities	Decreasing	TBD	Stable	Increasing	3 spp
"	3. Population trends of protected animal species	**Decreasing**	TBD	Stable	Increasing	2 spp 23% stable/increasing (CWCS)
LANDSCAPE CONTECXT	4. Measure of change in forest extent/ connectivity	TBD	TBD	TBD	TBD	Phase 2?
"	5. Distance from roads (LO CAP)	TBD	TBD	TBD	<20% of land area is within 375m of roads	Phase 2

BIODIVERSITY FEATURE 5: GRASS/SHRUBLANDS

Definition: Meadows, early successional farmlands, selected capped landfills within the ARA.

ATTRIBUTE 1: ACREAGE (AMOUNT)

- Indicator 1: Acreage of grassland/shrubland cover

ATTRIBUTE 2: SPECIES COMMUNITIES/DIVERSITY (CONDITION)

- Indicator 2: Population trends of protected grassland and shrubland bird species
- Indicator 3: Presence of rare plant species

ATTRIBUTE 3: CONNECTIVITY/SUCCESSION POTENTIAL (LANDSCAPE CONTEXT)

- Indicator 4: Percent grass/shrub cover with potential for natural succession

GRASSLANDS AND SHRUBLANDS

Key Attribute	Indicator	Poor	Fair	Good	Very Good	Greenway Rank & Data Source
AMOUNT	1. Acreage/% of grass and/or shrubland	TBD	TBD	TBD	TBD	6.6% (LIDAR—Greenway coastal areas only)
CONDITION	2. Populations of protected grass and shrubland bird species	**Decreasing**	TBD	Stable	Increasing	4% increasing (CWCS)
"	3. Presence of rare plant species	Decreasing	TBD	Stable	Increasing	5 spp
LANDSCAPE CONTEXT	4. % cover with potential for natural succession	TBD	TBD	TBD	TBD	Phase 2 (Confirm with DEC)

BIODIVERSITY FEATURE 6: ISLANDS

Definition: Natural and manmade islands, breakwalls and surrounding shallow water habitat.

ATTRIBUTE 1: ACREAGE (AMOUNT)

- Indicator 1: Acreage of island habitat compared to historic
- Indicator 2: Amount of protected island habitat

ATTRIBUTE 2: SPECIES COMMUNITIES/DIVERSITY (CONDITION)

- Indicator 3: Presence of rare and/or key native plant species and communities
- Indicator 4: Population trends of protected colonial nesting bird species

ATTRIBUTE 3: CONNECTIVITY (LANDSCAPE CONTEXT)

- Indicator 5: Measure of change in protected island habitat

ISLANDS

Key Attribute	Indicator	Poor	Fair	Good	Very Good	Greenway Rank & Data Source
AMOUNT	1. Acreage of island habitat compared to historic	TBD	TBD	TBD	TBD	Phase 2 (BNR: aerial image analysis)
"	2. Amount of protected island habitat (St. Mary River CAP goals)	30%	30-50%	50%	>50%	Phase 2
CONDITION	3. Rare or key plant species/communities	Decreasing	TBD	Stable	Increasing	Phase 2
"	4. Population trends of colonial nesting birds	Decreasing	TBD	Stable	Increasing	Phase 2
CONNECTIVITY	5. Measure of change in protected island habitat	Decreasing	TBD	Stable	Increasing	Phase 2 (Contingent upon GIS intern)

BIODIVERSITY FEATURE 7: UNIQUE AREA - NIAGARA GORGE

Definition: Including six miles of cliffs, talus slope, bedrock shoreline and vegetated rim between the falls and the northern edge of the Niagara Escarpment at Lewiston.

ATTRIBUTE 1: ACREAGE (AMOUNT)

- Indicator 1: Acreage of natural areas within and continuous to gorge rim
- Indicator 2: Acreage protected for long-term conservation (NR RAP, Ontario)

ATTRIBUTE 2: SPECIES COMMUNITIES/DIVERSITY (CONDITION)

- Indicator 3: Presence/trends of protected animal species/populations
- Indicator 4: Presence/trends of protected plant species and communities
- Indicator 5: Percent non-native/invasive vegetation

ATTRIBUTE 3: CONNECTIVITY (LANDSCAPE CONTEXT)

- Indicator 6: Amount of gorge within 375m of roads
- Indicator 7: Intact key ecological processes (e.g. seeps; micro-hydrologic regime)
- Indicator 8: Adaptability of key ecological species/communities to water level changes

NIAGARA GORGE

Key Attribute	Indicator	Poor	Fair	Good	Very Good	Greenway Rank & Data Source
AMOUNT	1. Acreage of natural areas	TBD	TBD	TBD	TBD	Phase 2
"	2. Acreage protected for long-term conservation (NR RAP Ontario)	TBD	TBD	TBD	80%	Phase 2
CONDITION	3. Presence/trends of protected animal species and populations	Decreasing	TBD	Stable	Increasing	Phase 2
"	4. Presence/trends of protected native plant species and communities	Decreasing	TBD	Stable	Increasing	Phase 2
"	5. % of non-native/ invasive vegetation	TBD	TBD	TBD	TBD	Phase 2
LANDSCAPE CONTEXT	6. Amount gorge within 375 m of roads (LO CAP)	TBD	TBD	TBD	<20%	Phase 2
"	7. Key ecological processes intact (seeps, micro-hydrology)	TBD	TBD	TBD	TBD	Phase 2 (In conjunction with State Parks NHP Gorge Survey)

PART 4. BUDGET: Proposed vs. Actual

The following spreadsheet is a summary of the original funded budget found in our application compared with the actual amounts expended. There are variances for some of the line items and they are summarized below:

- **Personnel Expenses**: salary and fringe—originally budgeted at $47,850. Actual expenditures at the end of the grant period amounted to $51,700. More personnel hours and expenses were needed in order to fulfill the grant obligations. RIVERKEEPER® utilized general operating funding in the amount of $3,850 in addition to the grant funds to supplement this need.
- **Contractual Services Expenses**: originally budgeted at $74,975. Actual expenditures at the end of the grant period amounted to $76,000. RIVERKEEPER® elected to use $1,000 out of the Indirect Costs line to pay for an AmeriCorps member. This AmeriCorps member focused 80% of their time directly on this project and worked 40 hours per week for one full year equating to a value of $41,600 to support this project.
- **Supplies Expenses**: originally budgeted at $1,250. Actual expenditures at the end of the grant period amounted to $1,191.72.
- **Travel Expense**: originally budgeted at $750. Actual expenditures at the end of the grant period amounted to $683.25.
- **Indirect Cost Expenses**: originally budgeted at $12,960. Actual expenditures at the end of the grant period amounted to $12,060.03. This decrease is due to the expenses for contractual services as mentioned above.

In addition, RIVERKEEPER® supported the program with the following resources:

- 200-hour Internship (Aaron Feeney) through Erie Community College valued at $4,000 – To create a GIS database that will provide baseline metrics of existing shoreline conditions of the Niagara River and its tributaries within the Niagara River Greenway. These metrics will provide valuable data to evaluate the health and condition of the watershed in the context of ecological function. The details of the internship are as follows:
    - *Digitization* (creation of spatial GIS vector features) of the shoreline, both right and left bank where clearly visible from 2011 NYS digital orthophotos, of the Niagara River and its tributaries within the project boundary;
    - *Attribution* of associated data elements (attributes) will also be collected: Canopy cover and hardened/soft shoreline;
    - *Grouping and subgrouping* (classifications) of the above elements will be stored within the GIS database structure. Specific groupings will mimic existing datasets (NYPA) as best as can be deciphered from high resolution web based mapping;
    - *Quality Control* a level of confidence will be recorded for attributed data, and ambiguous classes will be noted for potential field verification;
    - *Metadata Creation* after data creation, attribution, and quality control is complete, metadata will be created as a component of the database.
- 55-hour Internship (Melissa Muth) though Daemen College valued at $1,100 – Tasks included assisting in completing the Conservation Action Planning model, conducting research, compiling data, and creating reports regarding current and desired status of biodiversity features in the watershed.
- Additional RIVERKEEPER® staff time valued at $3,850.
- AmeriCorps member working full time for one year valued at $41,600.

Niagara River Greenway Regional Restoration Habitat Strategy						
FINAL Budget vs. Actual						
Proposed Budget			**Final Budget**			**Difference**
Category	**Amount**		**Category**	**Amount**		
Personnel Including Fringe Benefits	$47,850.00		Personnel Including Fringe Benefits	$47,850.00		$0.00
Supplies and Equipment	$1,250.00		Supplies and Equipment	$1,191.72		($58.28)
Travel	$750.00		Travel	$683.25		($66.75)
Contractual	$74,975.00		Contractual	$76,000.00		$1,025.00
Overhead	$12,960.00		Overhead	$12,060.03		($899.97)
Total	**$137,785.00**		**Total**	**$137,785.00**		**$0.00**
Other Project Contributions						
BNR Donated Staff Time	$3,850.00					
AmeriCorps Member Time	$41,600.00					
200 Hour Course Credit Internship	$4,000.00					
50 Hour Internship	$1,100.00					
Total Project Support	**$50,550.00**					
TOTAL PROJECT COSTS	**$188,335.00**					

PART 5. POTENTIAL HABITAT CONSERVATION OPPORTUNITIES

The following are site-specific examples of how the CAP assessment, begun in Phase 1 of the Niagara River Greenway Strategy, can inform and support habitat, local, and regional conservation efforts.

Each example includes:

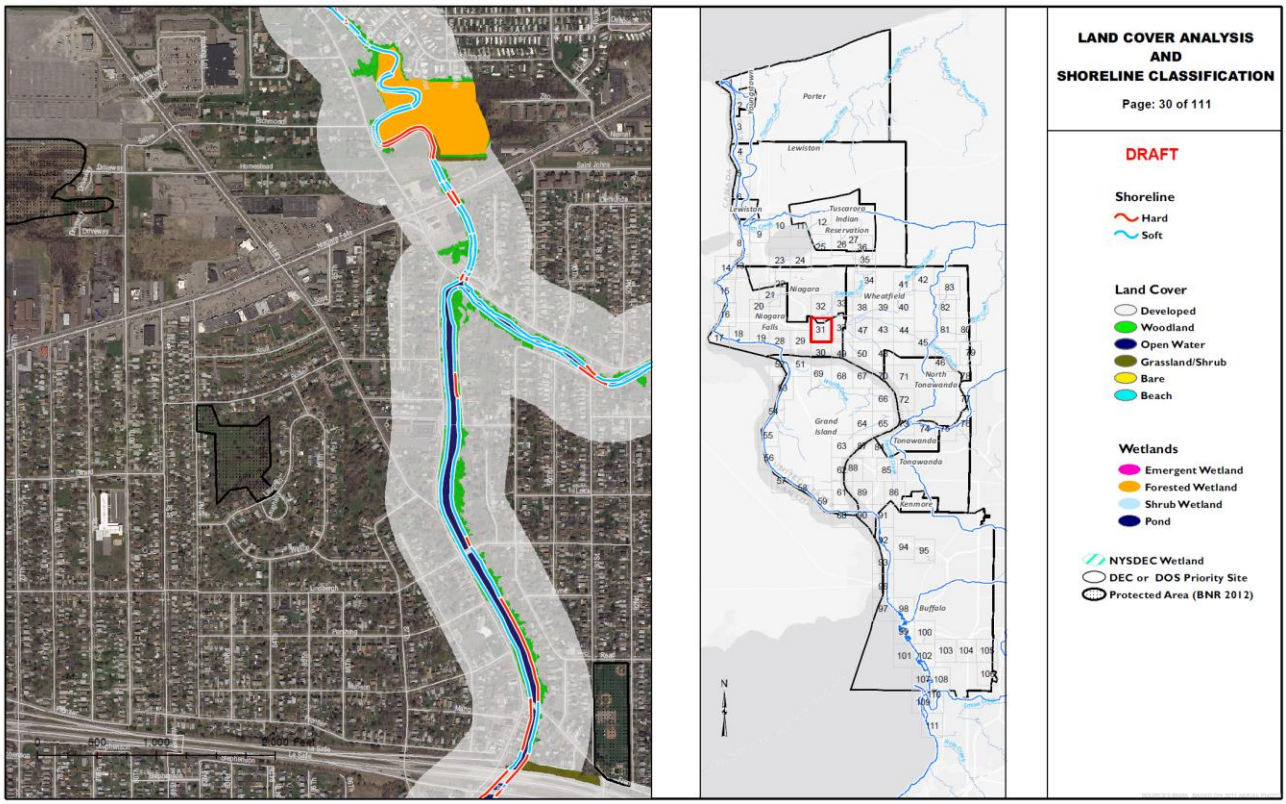
- Relevant state and regional habitat goals and objectives
- An initial assessment (amount, condition, connectivity) of the site's biodiversity features
- Resources for implementation including funding, land use management and policy opportunities, current broader initiatives, local capacity, stakeholder interest, etc.

Cayuga Creek Riparian Habitat/City and Town of Niagara Falls

1. Selected State and regional goals:
   - Protect intact riparian buffers (CWCS)
   - Identify opportunities for NPS pollution abatement in Cayuga Creek watershed (CWCS)
   - Increase protected natural shoreline (RAP)

2. Current conditions:
   - Low BAP and SVAP scores indicate poor aquatic and riparian habitat due to channelization and hardened shoreline, barriers to flow and fish movement, and lack of tree cover
   - 12-15 acres of forested riparian wetland and natural bank just north of Niagara Falls Blvd. is a significant asset, but not protected
   - Olin landfill restricts opportunity on west bank of creek
   - CSOs need to be assessed for potential modifications to support habitat goals

3. Opportunities:
   - NRDC funds are available for habitat restoration benefitting Cayuga Creek and the City of Niagara Falls.
   - Riparian wetlands, if protected and restored, will continue to provide needed runoff filtration, stream cover, riparian habitat and connectivity.
   - Options: conservation easements, outright purchase, landowner agreements, buffer programs.
   - Look to expand connectivity of natural shoreline upstream and down (e.g. 1.5 acres of City-owned riparian woodland habitat at confluence of Cayuga and Bergholtz Creeks).

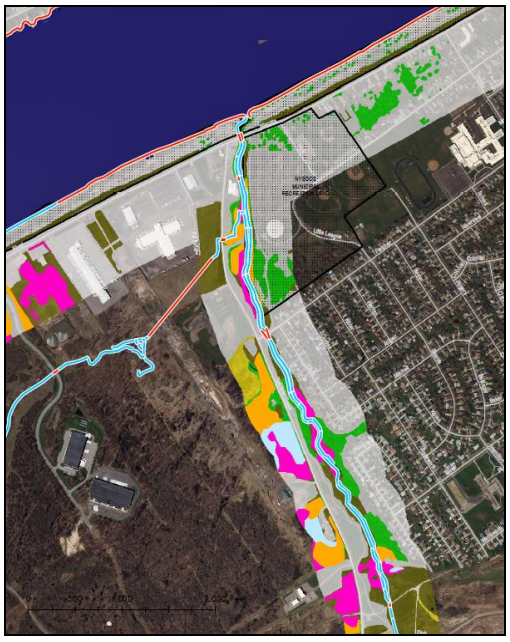


Town of Tonawanda Riverfront

1. Selected State and regional goals:
   - Increase coastal wetlands (RAP)
   - Identify forested and grassland tracts adjacent to wetlands for acquisition, protection and restoration (CWCS)
   - Increase areas of natural and buffered shoreline (RAP & CWCS)
   - Reduce pollution and siltation from runoff (CWCS)
   - Increase habitat for grassland and shorebirds (CWCS)

2. Current conditions:
   - Generally "Poor" due to shoreline hardening, past industrial contamination, capped landfills, lack of protected wetlands and lack of natural cover (SVAP)
   - Peregrine falcon, Osprey, Heron species, Bobolink and other grassland birds use area for nesting and/or foraging
   - Populations of most protected grassland bird species are decreasing

3. Opportunities: Property owners and the Town are interested in redeveloping this waterfront to develop river access and connect with Riverwalk. A well thought out strategy could also significantly improve Upper Niagara River grassland and wetland habitat values.
   - Location/historic potential: This area was part of the largest coastal marsh in the Upper Niagara, known for its great variety of resident and migratory wading and grassland birds
   - An approximate 3-mile strip of shoreline (154 acres) – from River World north to Town line—is in transition from heavy industry. Potential for riparian habitat and natural shoreline restoration
   - Some landfill remediation (Cherry Farm) will accommodate successional grassland habitat
   - "Rattlesnake Creek and its associated wetlands should be maintained as open space, possibly with limited trail access connecting to the Two-Mile Creek trail system. This will help establish a new image for the area" (LWRP).

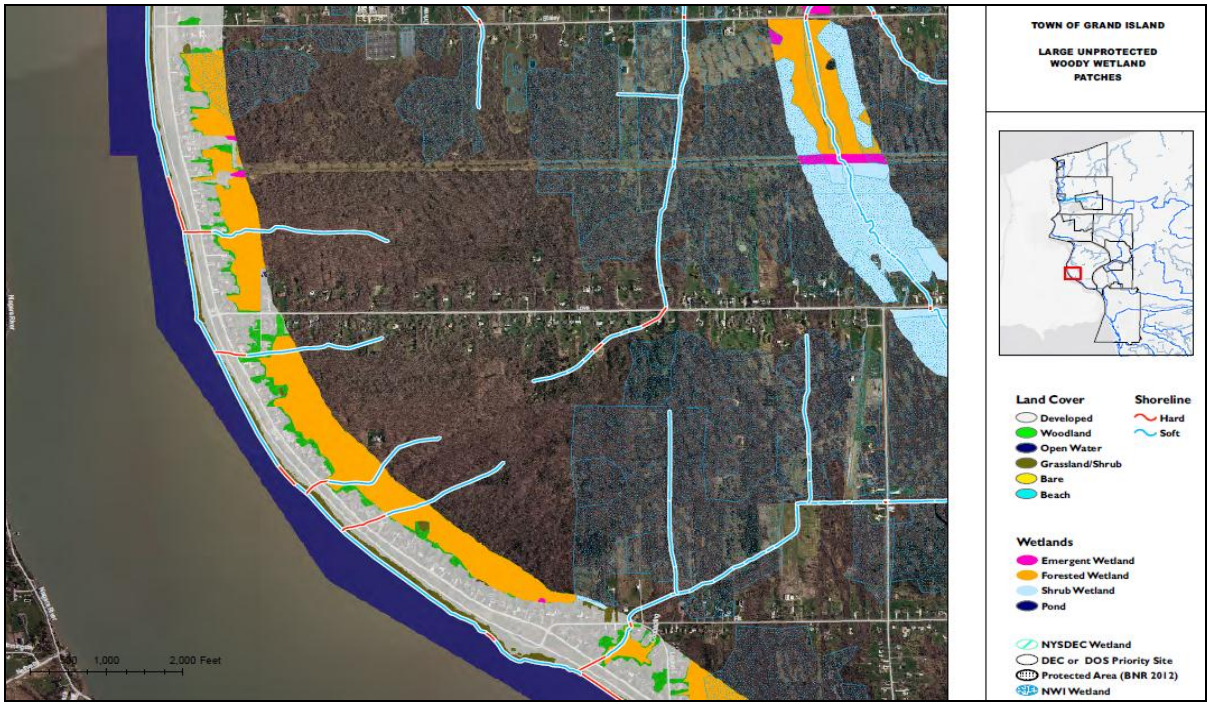


Grand Island SW Forested Wetlands

1. Selected State and regional goals:
   - Protect/restore instream and riparian habitat for SGCN species including listed mussels (CWCS)
   - Control invasive species where they negatively affect marsh-nesting birds (CWCS)
   - Eliminate/mitigate the barrier effects of transmission lines (CWCS)

2. Current conditions:
   - Grand Island (GI) includes over one third (36%) of the Niagara River shoreline, 22% of the Greenway ARA, 32% of Greenway coastal wetlands, and 32% of Greenway protected fish and mussel species. It has the only streams within the Greenway boundary with "Good" predicted BAP scores, indicating only slightly impacted aquatic habitat
   - Approximately 200 acres on the northeast portion of GI were identified in the 2012 Niagara River RAP Addendum as an opportunity for coastal wetland creation
   - LIDAR analysis reveals additional wooded wetland habitat in southwest GI, much of it tributary to valuable coastal habitat for fish, mussels, amphibians and other species

3. Opportunities:
   - GI LWRP and zoning, including Enhanced Environmental Overlay District to protect fish and wildlife habitat values
   - Town interest in habitat conservation
   - Greenway funds
   - Restore connectivity along transmission line to eliminate barrier effects for wildlife

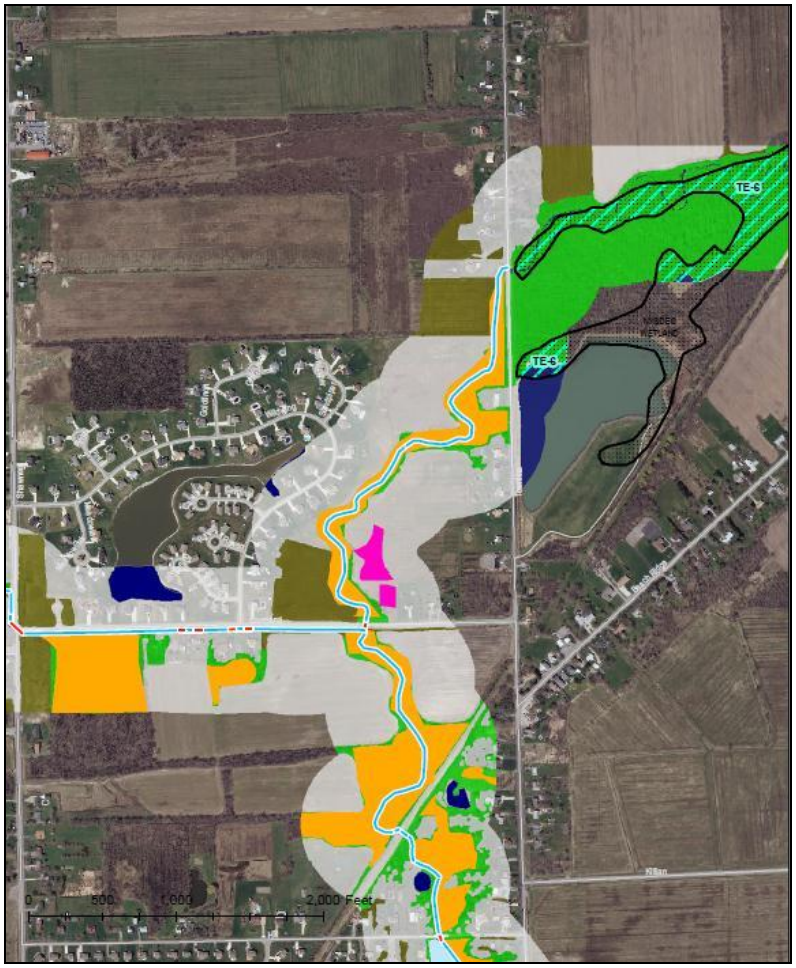


Headwater Stream Protection: Bull Creek

1. Selected State and regional goals:
   - Pursue activities to acquire/protect habitat for Species in Greatest Conservation Need (CWCS)
   - Identify/acquire/protect/restore forested and grassland tracts adjacent to wetlands for amphibian, reptile and marsh nesting birds (CWCS)
   - Identify opportunities for agricultural buffer establishment (CWCS)

2. Current conditions:
   - The Bull Creek SVAP (BSC, 2011) indicates generally good condition (7.8 average) with main problems identified as nutrient enrichment from agricultural land and lawn runoff
   - 97% of its 21-mile shoreline (including both banks) is not hardened
   - Northern pike are known to travel upstream as far as between Pendleton and Bar Rd. (TU)
   - Six protected bird species in headwater areas include Sharp-shinned hawk, American woodcock, Black-billed cuckoo, Wood thrush, Bobolink, and Eastern meadowlark

3. Opportunities:
   - Opportunity to increase connectivity value of State-protected wetland by protecting stream corridor forested and emergent wetlands downstream
   - Opportunity to protect SGCN



Aquatic Habitat Improvements: Fish Barrier Removal

1. Selected State and regional goals:
   - Identify opportunities to provide migration corridors for wildlife (CWCS)
   - Protect and restore coastal and tributary habitats (GLFC)

2. Current conditions:
   - Field survey assessed 26 fish barriers within Greenway boundary—at least 8 with potential for removal or mitigation. These include several debris blockages on Spicer Creek; culverts on Big Sixmile, Twomile, Woods, and an Unnamed Grand Island tributary; and the first impassable barrier on Gill Creek (dam at Hyde Park)

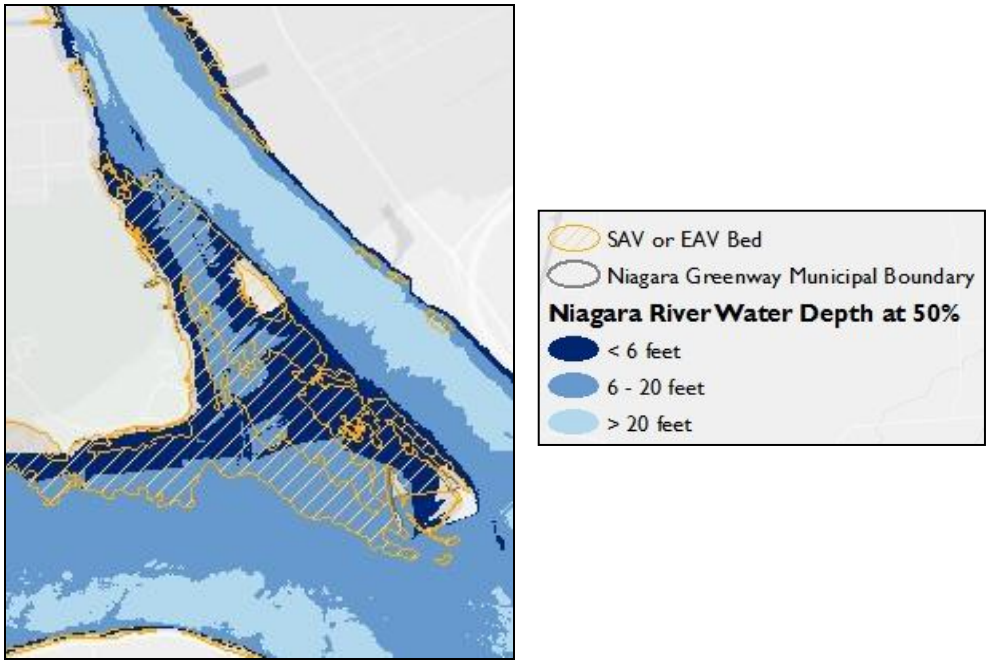
3. Opportunities:
   - Grant opportunities to reduce barriers/increase aquatic habitat in a watershed context
   - Possible cooperation with Town and City Department of Public Works to replace or retrofit barriers

Aquatic Habitat Improvements: Island and Riverine Habitat Protection

1. Selected State and regional goals:
   - Protect and maintain Niagara River nearshore habitat including beds of SAV/EAV (CWCS, RAP)
   - Populations of colonial nesting birds should be stable to increasing (RAP, IBA)
   - Protect spawning and nursery areas for top predator species: Lake sturgeon; Musky (RAP)

2. Current conditions:
   - Amount/percent of shallow water (<6 feet) habitat in the Niagara River: <20% of total
   - Four significant island complexes in Upper River: Goat-Three Sisters Islands; Strawberry-Motor-Beaver Islands; Buckhorn-Grass Islands; Squaw–Bird Island-Outer Harbor breakwalls
   - 400-acre Strawberry Island complex includes over a third of NR shallow water habitat
   - Riverine spawning/nursery habitats are threatened by marina development, water level fluctuations, wakes, loss of SAV/EAV

3. Opportunities:
   - Greenway and HERF funds – building on HIPs and IBA goals
   - State DEC protection/acquisition/restoration of riverine wetlands and islands
   - State Parks management of islands for long-term conservation
   - Boater, angler and birder support for long-term island management plans for Strawberry and Buckhorn Island complexes including no powerboat entry and no wake zones near sensitive habitats



Strawberry Island and the shoal water between it and Frog island and Grand Island included one of the most extensive and prolific areas of aquatic vegetation in the Niagara river. The series of submerged sandbars were covered with a dense growth consisting mostly of pondweeds. The land area was covered with slough grass (Spartina michauxiana), shore rush (Scirpus americanus) and bulrush (Scirpus acutus). Various species of arrowhead (Sagittaria) and spike rush (Eleocharis) were common in the shallow areas dissecting the island (NY Conservation Department, 1928).