

Chapter 4 Municipal Action Plans

The following Chapter details specific opportunities for habitat conservation and restoration for each municipality within the Greenway. Specific strategies included in the municipal recommendations relate directly to those described in Chapter 3. It should be noted that villages are combined with the towns in which they are located due to their size. The Tuscarora Reservation is excluded from the analysis due to the sovereign nature of their territory. The Village of Kenmore was also not included due to the fact that it is outside of the project area.

4.1 Town & Village of Lewiston

Existing Conditions:

The Town and Village of Lewiston are situated along the lower Niagara River immediately north of the City of Niagara Falls. Although these municipalities are less developed than most areas of the Greenway, they have experienced impacts from the construction of the Niagara Power Plant. For example, the Power Reservoir took a large area of town land and required the channelization and diversion of both Gill Creek and Fish Creek. Water level fluctuations from daily operation of the power plant have affected the shoreline and aquatic habitat along the riverfront.

The Niagara Gorge is a significant feature in the town and village and can be appreciated in several state parks. Center Street in the Village of Lewiston marks the end of the Niagara Escarpment and transition to the Lake Ontario Plain. The Town of Lewiston also has great potential for protection of natural resources as it contains the third greatest acreage of natural area of all municipalities within the Greenway next to Grand Island and Wheatfield (2,406 acres in the town and 99 acres in the village).

New York's only active hazardous waste landfill, Chemical Waste Management (CWM), is located within the Town of Lewiston and Porter. Although its location is outside of the project area, it is important to examine how operations from the landfill impact watershed and Greenway health and vitality. Past activities at CWM include landfilling of over 9 million tons of hazardous waste and a long history of permit violations and corrective actions. Annual discharges to the river range between 10 and 30 million gallons of treated wastewater, potentially increasing the amount of PCBs found in the river and downstream. The environmental impacts related to CWM and other hazardous waste landfills should be carefully studied and understood by local authorities and residents in the context of the growing ecological, recreational, and environmental values of the Greenway.

Stream function: The headwaters of both Fish and Gill Creeks originate in the Tuscarora Reservation, and are then highly channelized along the power project reservoir as they travel towards the Niagara River. Fish Creek is contained entirely within the town, whereas Cayuga and Gill Creeks travel south through the Town of Niagara and City of Niagara Falls.

Population: Town: 16,262, Village: 2,701 (2010 census)

Annual Growth Rate: Town: 0.03%, Village: -2.88% (2000-2010)

Existing Institutional Framework:

Town: Zoning Code, 2013

Village: Local Waterfront Revitalization Plan, 2001, amended 2011, Municipal Code, updated 2014

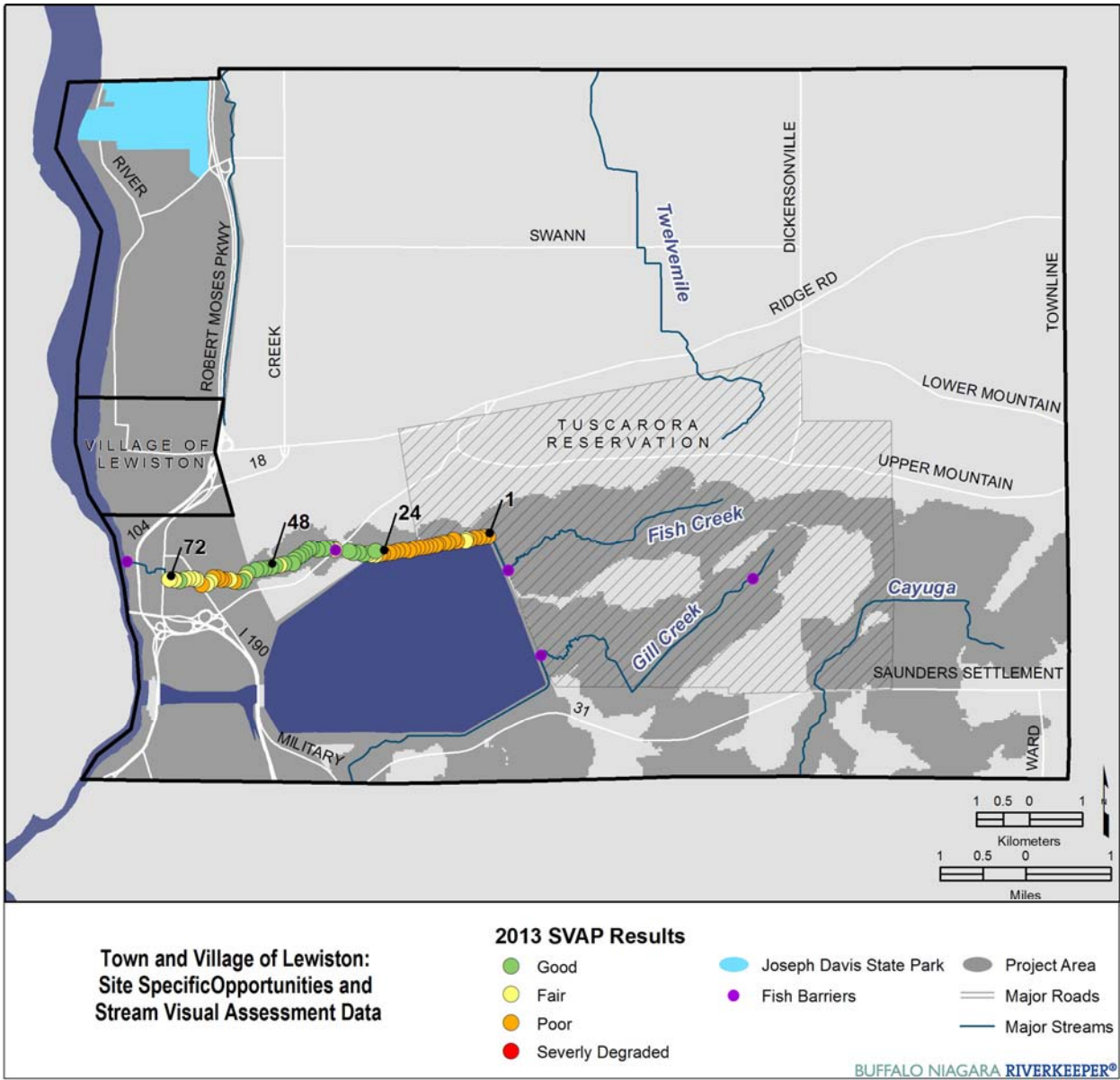
Habitat in the Town and Village of Lewiston:

Total Municipalities: 26,240 acres
Project Area: 7,641 acres (29% of municipalities, 9% of total project area)
NHD Streams: 92.4 miles
Coastline: 6.7 miles
Wetlands: 1,420 acres
Woodlands: 937 acres
Grass/Shrublands: 148 acres
Natural Areas: 2,505 acres

Recommendations:

The Town and Village of Lewiston hold great opportunity in terms of habitat restoration due to their location along the lower river and the fact that they contain significant areas of undeveloped natural land. Opportunity also exists to improve stream conditions within the town.

Map 4.1 Town and Village of Lewiston: Opportunities and Stream Visual Assessment Data



Note: SVAP data displayed corresponds to overall score for each Reach from 2013 assessment. Reach numbers roughly correspond to recommended actions along each stream.

Implement SVAP Recommendations.



Reach 17 along the NYPA reservoir. This area would benefit from shoreline and in-stream improvements.

A Stream Visual Assessment was completed for a portion of Fish Creek along the reservoir and downstream towards its mouth within the Town of Lewiston (Map 4.1). Results from the assessment found varying conditions along the stream that can generally be broken up into three sections. The upper section of the stream is channelized to accommodate the Niagara Power Reservoir and the average score is “poor.” This section (Reaches 1-33) would benefit from riparian zone and canopy cover improvements and instream habitat restoration (e.g. bed structure and pools). The middle section (Reaches 34 through 51) has had limited disturbance and therefore would benefit from riparian zone and habitat conservation to preserve in-stream habitat, including pools and areas containing coarse bed substrate. Trash and debris, recreational

vehicles, and mowing in riparian areas were the major disturbances to the stream observed along this section. Programs geared toward providing education to landowners along the creek on stewardship practices to preserve the current conditions would be beneficial. The lower section (Reaches 56-72), particularly the portion of the creek within the Niagara Falls Country Club, would benefit from riparian zone improvements, bank condition improvements, and in-stream aquatic habitat enhancements. Invasive species (e.g. Purple Loosestrife, Phragmites) management is needed in the upper and middle portions of the assessed creek (Reaches 1-38; Frothingham, 2014).

Reduce stream barriers in areas of known or probable interference with aquatic life.

Three documented stream barriers exist along Fish Creek and two along Gill Creek (Map 4.1). The first barrier on Fish Creek is a geological barrier where a manmade spillway presents an approximately 110 foot jump over the gorge wall at Artpark State Park. Because of the fact that migratory fish cannot access Fish Creek, mitigation measures at the upstream barriers are not a priority (information on these barriers can be found in the Technical Report).

The two barriers along Gill Creek fall within the Tuscarora Reservation, therefore mitigation options are not discussed here.



Spillway at the mouth of Fish Creek.

For public acquisition, prioritize escarpment and other headwater woodlands, remnant native communities, and parcels that will increase forest tract size to >100 acres.

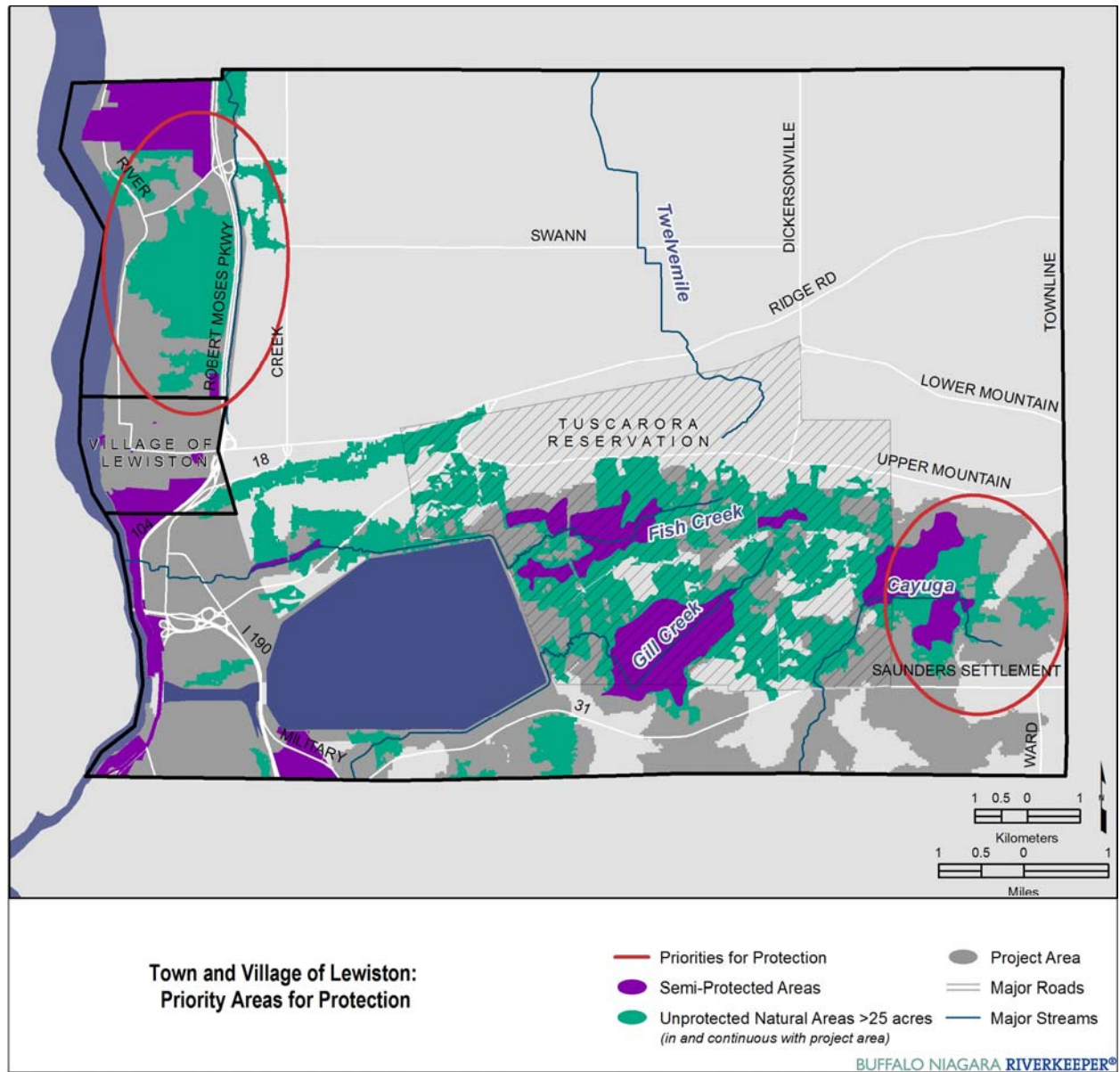
The town contains the second greatest amount of woodlands next to Grand Island (854 acres in the town, 83 in the village) with 400 acres of core forests (over 50 acres). These, along with other natural land covers, are a priority for protection within the town (Map 4.2). Priority areas exist just south of Joseph Davis State Park and east of the Tuscarora Reservation. The proximity to Joseph Davis State Park, Earl W.

Brydges Artpark, Devils Hole State Park, Reservoir State Park, and Stella Niagara Preserve make the lands along the waterfront ideal area to preserve and protect, and would contribute to the Niagara Greenway through the protection and connection of significant natural areas along the waterfront. Additionally, the priority area in the southeast portion of the town is located within a critical headwater forest and if protected would connect two DEC wetlands that when combined create a 283-acre patch of natural land that is significant within the context of the Greenway. Due to the size and location of undeveloped parcels within these areas, there is significant development risk: therefore, taking further actions to assess available parcels and protect them in perpetuity should be a top priority for the Greenway.

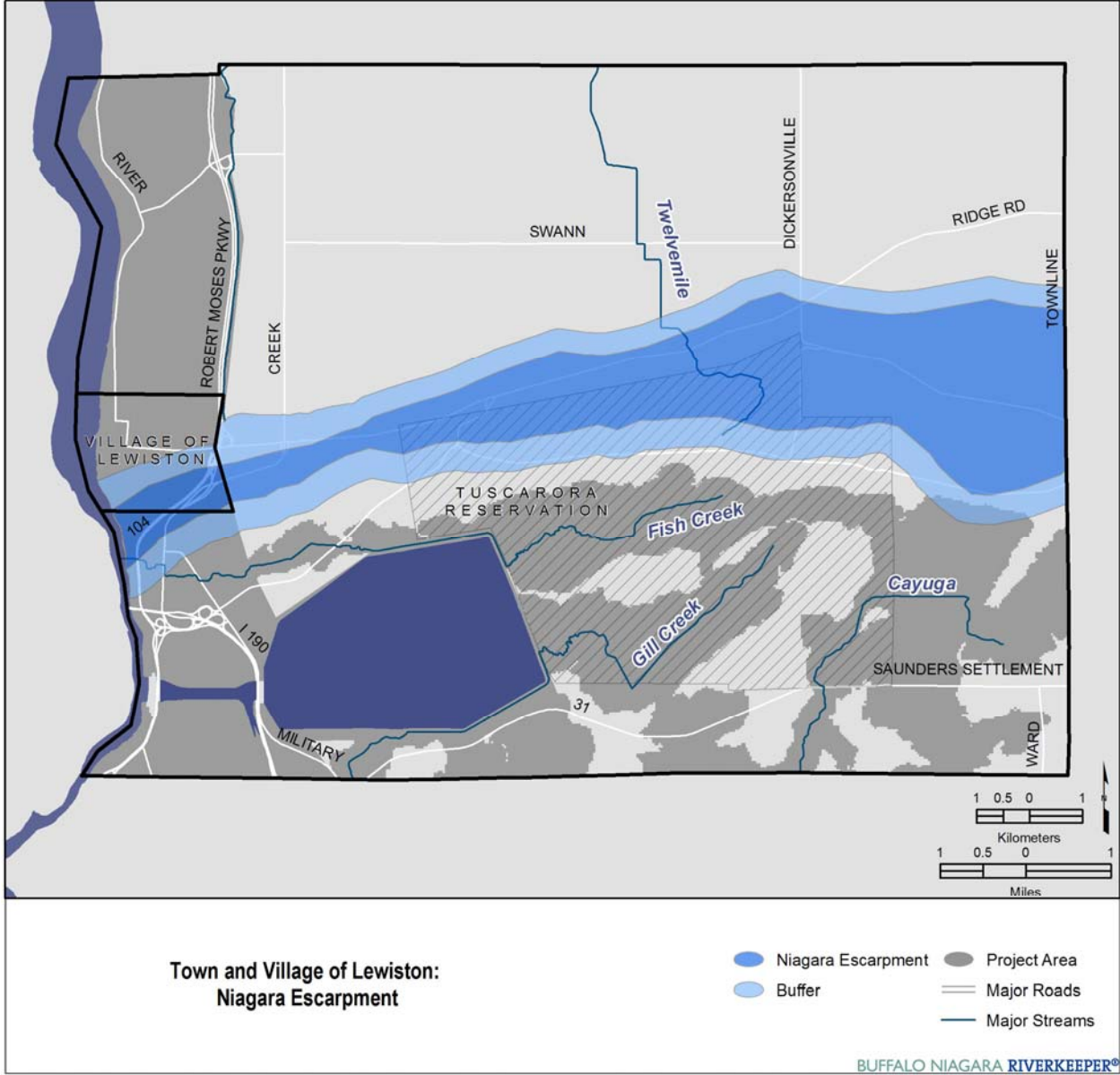
The Niagara Escarpment, a large geologic feature that runs through both the Village and Town of Lewiston, is another priority area for acquisition and protection (Map 4.3). Although very little of the Niagara Escarpment exists within the Greenway project area, its extent within Niagara County has been recognized in the NYS Open Space Plan and by the Great Lakes Commission as a priority for protection and habitat restoration due to its diversity of important habitats, presence of rare and protected species, and historical significance. The Western New York Land Conservancy conducted a study that identified restoration priorities and recommendations that should be referenced when making land use decisions within this area (E & E, 2014b).

Niagara River Greenway Habitat Conservation Strategy

Map 4.2 Town and Village of Lewiston: Priority Areas for Protection



Map 4.3 Town and Village of Lewiston: Niagara Escarpment (Source: WNYLC)



Increase habitat values of protected natural areas through improved management practices on public lands.

The habitat within the Town and Village of Lewiston and along the river is significant due to the fact that it is located within the gorge, providing habitats that support many sensitive plant and wildlife species. Many protected areas are located within these municipalities that serve to protect and provide access to unique areas of habitat including Earl W. Brydges Artpark (Artpark), Devils Hole State Park, and Reservoir State Park. In addition to expanding on these protected areas as described earlier, an important objective for these sites is the implementation of management practices that serve to enhance and restore habitat that has been lost or is threatened. Chapter 3 should be referenced for overall recommendations on management actions within the gorge. Other notable protected areas that may require special attention include Joseph Davis State Park and the Lewiston Plateau.

Joseph Davis State Park, located at the northern boundary of the Town of Lewiston adjacent to the river, provides significant grassland habitat along with recreational opportunities. The waterfront area along this stretch of the river has historically been identified as an important spawning ground, with a high catch rate occurring at Peggy's Eddy located mid-river west and downstream from the park (Lowie et al., 1999 and expert knowledge from fishery biologists). Although this area was not assessed through the Strategy, protection of spawning areas at this location and along other portions of the lower river (like Stella Niagara Preserve and eddies within the gorge) is a priority action for the Greenway. Threats to spawning habitats currently include wakes from jet boats that cause shoreline erosion and siltation, and daily water level fluctuations from the hydropower plants. Research along the lower river regarding fish communities and their distributions is needed in order to identify priority actions for protection.

The Lewiston Plateau, adjacent to Artpark off of Portage Road, consists of 42 acres created from debris excavated from the gorge during the construction of the Niagara Power Plant. This area, owned by the Village of Lewiston, is partially dedicated to grassland habitat (Buffalo Niagara Riverkeeper, 2008). Due to the fact that several alternative land uses have been considered for this area, it is important that the area of grassland be preserved and enhanced to provide conditions valuable to grassland birds that are in decline within the region.

Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

It is recommended that the Town and Village of Lewiston align efforts to manage shared natural resources in a manner that strives to protect and enhance important habitats including the gorge and grassland areas. A major threat to existing unprotected natural areas within the municipalities is future development. Adopting regulations to strengthen protection of these lands is recommended for both the town and village (see Chapter 3, Strategy 13 for more details).

4.2 Town of Niagara

Existing Conditions:

The Town of Niagara historically was a farming community but today it has considerable residential, industrial, and commercial development (mostly centered around Military Road). One of the most significant opportunities for conservation in the town is the protection and expansion of grassland habitat, which has been considerably depleted throughout the Niagara River Greenway. The town has the second highest acreage of grassland out of all municipalities within the Greenway (246 acres) accounting for 14% of grassland habitat found in the total Greenway project area (NOAA 2010). In addition, a few large patches of unprotected natural land can be found along Gill and Cayuga Creeks (see Map 4.6). A large unprotected parcel of land along Cayuga Creek, known as the Weber Property, holds great opportunity for protecting a significant natural area and mitigating flooding within the town and is discussed in greater detail later on in this section.

Stream function: The middle sections of both Gill and Cayuga Creeks are contained within town boundaries (Map 4.4). Flooding along Cayuga Creek due to channelization and increased runoff has been and remains a significant concern for the town.

Population: 8,378 (2010 census)

Annual Growth Rate: - 6.7% (2000-2010)

Existing Institutional Framework:

Comprehensive Plan, 1972

Zoning Code, 2001

Habitat in the Town of Niagara:

Total Municipality: 6,016 acres

Project Area: 3,862 acres (64.2% of municipality, 4.6% of total project area)

NHD Streams: 12.18 miles

Coastline: 0.0 miles

Wetlands: 327 acres

Woodlands: 270 acres

Grass/Shrublands: 246 acres

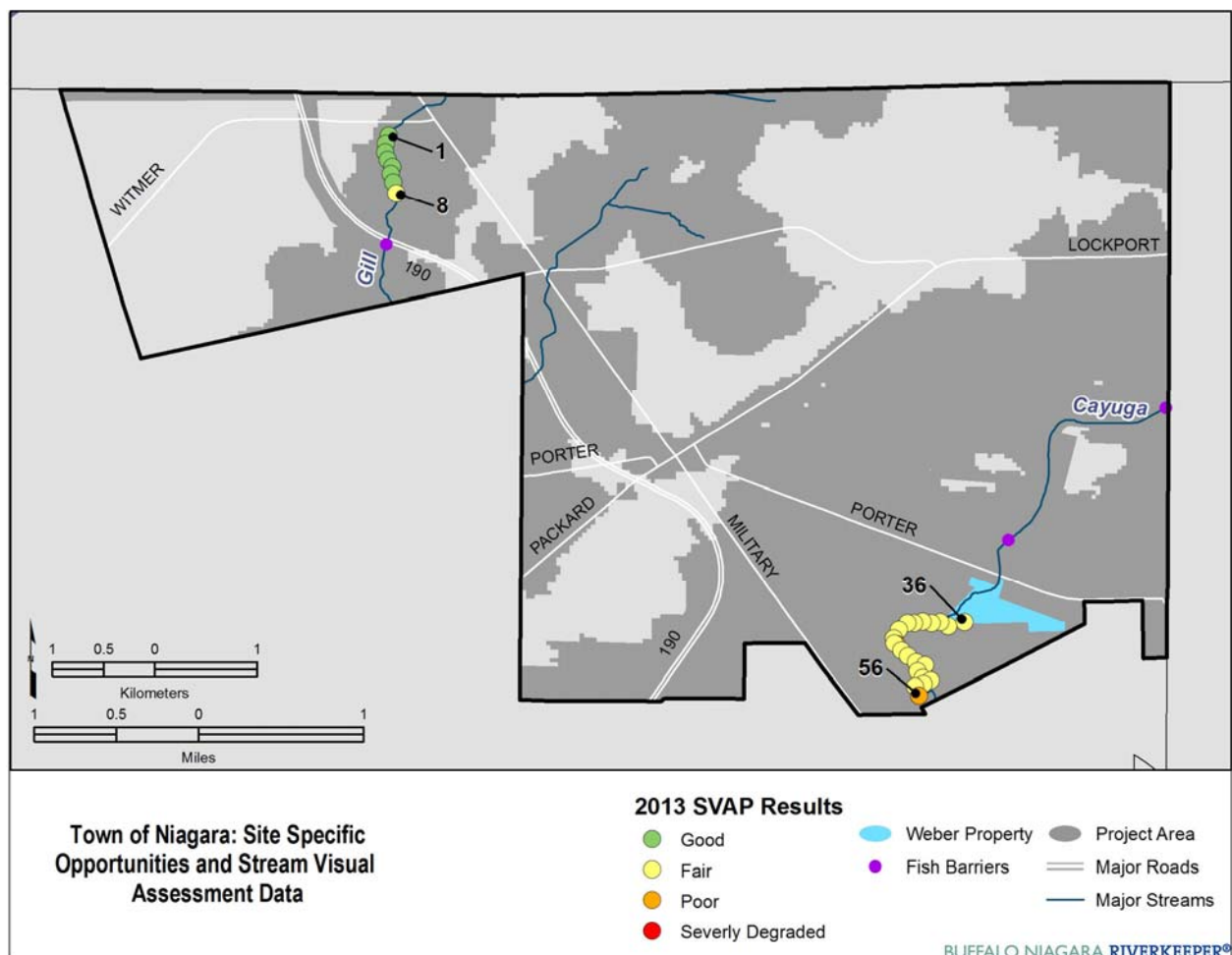
Natural Areas: 843 acres

Recommendations:

Conserving existing grassland and unprotected natural habitat is a major priority in the town along with addressing problems along waterways (i.e. flooding and degraded stream channels). Other main objectives for preserving habitat within the Town of Niagara are outlined in their Comprehensive Plan:

- Identify problems related to flooding and storm water drainage and restrict new development in areas subject to flooding ;
- Preserve natural drainageways and stream courses through required dedication of easements, town purchases of right-of-ways, and through other forms of municipal control in order to prevent flooding and to permit proper natural and less costly drainage; and,
- An emphasis is placed upon the preservation of open space and the development of parks. In this way, streams can be preserved and the town would be in a position to develop an overall park system (Comprehensive Plan, 1972).

Map 4.4 Town of Niagara: Site-Specific Opportunities and Stream Visual Assessment Data

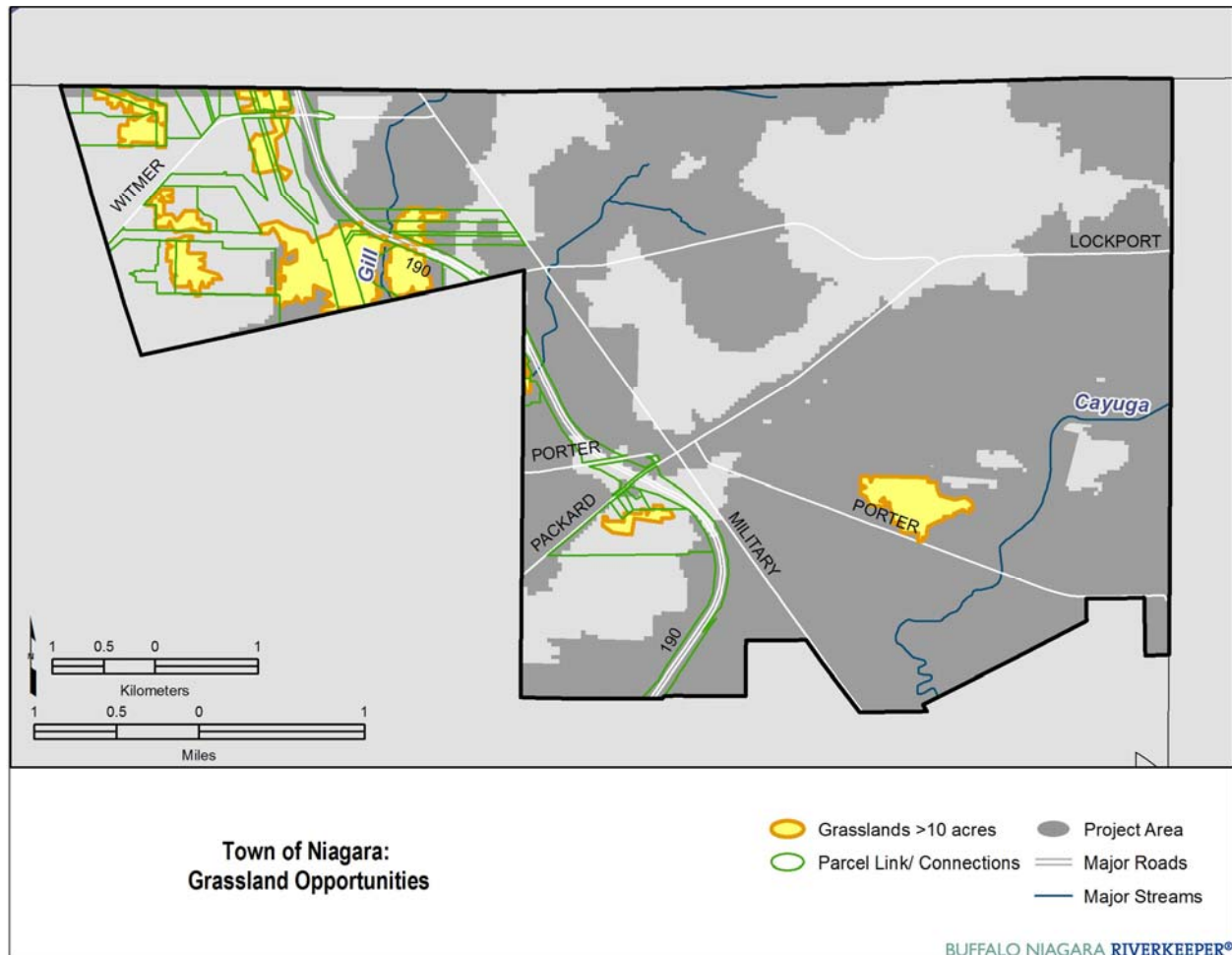


Note: SVAP data displayed corresponds to overall score for each Reach from 2013 assessment. Reach numbers roughly correspond to recommended actions along each stream.

Educate landowners about best management practices associated with grasslands, especially on agricultural lands.

The Town of Niagara holds high potential for the preservation and connection of grassland habitat. Conservation incentives and education and outreach to landowners, particularly for agricultural and abandoned land, is an important action needed to protect this important habitat type that is necessary in supporting many bird species that are in decline within the region. In addition to protection, opportunity also exists within the town to connect grassland areas and increase patch size. This would support a wider range of species and provide travel corridors between these habitats where a complete connection is not feasible. Map 4.5 highlights priority parcels for creation of connections between grassland habitats within the town, focusing on lands that are farmed or vacant along with right-of-ways which are easy to maintain as grassland. Lands within the town that contain grassland habitat are a priority for outreach and education to maximize their ecological value. Incentives can also be provided to landowners for maintaining their lands in a natural state and managing them for the benefit of grassland bird species as described in Chapter 3.

Map 4.5 Town of Niagara: Grassland Restoration and Conservation Opportunities



Reduce stream barriers in areas of known or probable interference with aquatic life.



A fence existing across the entire span of Cayuga Creek along the southern border of the Niagara Falls International Airport and Air Reserve Station for security purposes. This fence is choked with debris and sediment obstructing flow and fish and wildlife passage.

Two stream barriers exist along Cayuga Creek and one along Gill Creek in the Town of Niagara (Map 4.4). The first barrier along Cayuga Creek is a security fence installed at the southern (downstream) border of the Niagara Falls International Airport and Air Reserve Station (Station). The barrier is impassable to large fish due to the size of the fence meshing and debris that clogs it. If not consistently maintained, this also contributes to sediment issues in the stream as it slows flow rates. The likelihood of this barrier being removed is low due to security reasons, but a regular maintenance schedule would improve conditions along with creation of a few larger holes (8-10 inches) cut in the fence below the surface of the water, if agreeable to the Station.

The second barrier along Cayuga Creek is within the Station and therefore no field observations were made. Based on aerial photographs, it is estimated that approximately 1,300 feet of the stream passes through four culverts within the Station. Mitigation measures, where possible, include shortening of culvert sections to allow for more of the stream to be in a natural channel and decreasing the distance fish have to pass through the culverts. The installation of baffles in the culverts is another option that would break up flow and provide resting points for fish, allowing for easier passage. Both of these solutions would allow for better migration for bass, pike, minnows, and other fish species but would require negotiations with the Station.

The barrier along Gill Creek within the town was not field-assessed due to its location along NY Interstate 190 (no safe access) but based on the length of the culvert observed through aerial imagery; it is assumed this is a barrier to fish movement. Potential mitigation options include installation of baffles and if needed, grade control measures. Mitigation of barriers downstream within Hyde Park is currently being investigated. Once those are addressed, barriers further upstream may become a priority for fish passage.

Implement SVAP Recommendations.

Results from the Stream Visual Assessments completed for both Gill and Cayuga Creeks indicate the need for riparian zone and habitat conservation, bank condition improvements, trash and debris removal, and environmental education and outreach to landowners about stream stewardship practices. Gill Creek could particularly benefit from all of these measures in the section between Fox Avenue and Sherwood Drive (Reaches 1-8, Map 4.4). Additional bank stabilization is needed in Reach 8 as a structure in this location is being threatened by erosion. For Cayuga Creek, efforts should be focused on the section between Porter Road and Niagara Falls Boulevard (Reaches 36-56, Map 4.4). Channel and bank condition improvements in the section that flows through and downstream of the Cayuga Village Mobile Home Park would greatly improve stream conditions (Frothingham, 2014). This is discussed in further detail later in this section.



Reach 42 along Cayuga Creek. Environmental education and outreach to landowners is needed to improve riparian conditions.

Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

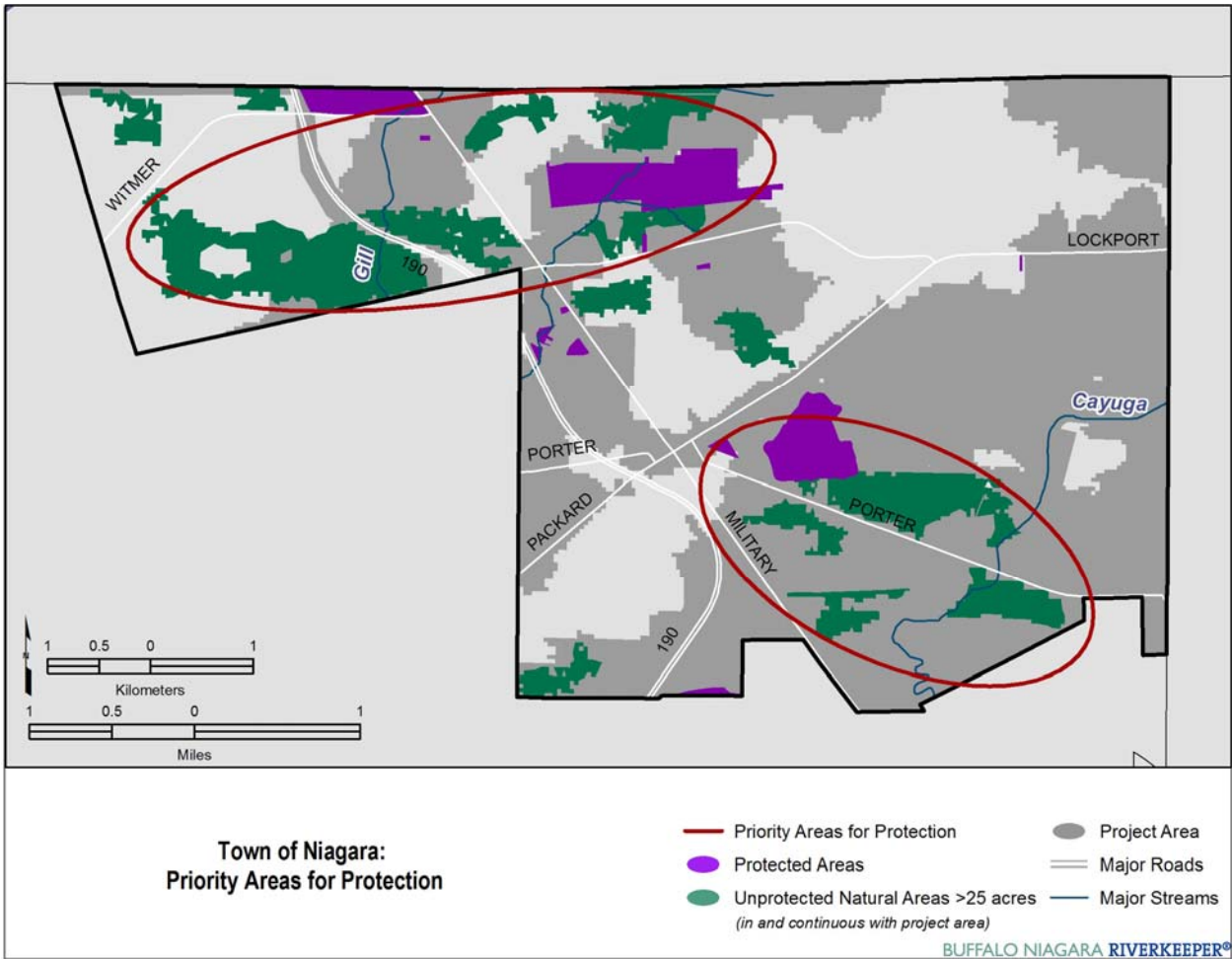
The enhancement and protection of stream buffers and the protection and re-establishment of active floodplains would significantly improve water quality and watershed ecosystem function within the town. Such improvements would reduce the risk of flooding by increasing storage capacity and decreasing runoff and erosion. Flooding is an issue in the Town of Niagara which has been amplified from channelization and development within floodplains (particularly along the Cayuga Creek corridor), increased impervious surface runoff, along with the expansion of the Airport and Air Reserve Station.

The Weber Property, located just south of the Niagara Falls International Airport and Air Reserve Station, is a large area of natural land currently for sale that contains significant, high quality habitat along Cayuga Creek. The primary objective for this site is protection and use as a living infrastructure demonstration project for mitigating flooding through the restoration of wetlands and floodplains. Opportunity exists to connect the current section of the stream that has been channelized to its historic floodplain in order to enhance ecological function and mitigate flooding. More details about the site are found later in this section.

Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

It is recommended that the Town of Niagara work to strengthen regulations to protect remaining intact natural areas (Map 4.6) and stream corridors. The resources provided through the Strategy and other assessments like the Cayuga Creek Watershed Restoration Roadmap (E & E, 2009) provide good baseline data to set priorities for protection within the town. Tools that are recommended for implementation in the town to protect natural resources include: vegetative stream buffers and development setbacks, tree ordinances, incentive zoning, and use of soft engineering where possible along stream banks (see Chapter 3 for more details). The town should also work with the Town of Lewiston and City of Niagara Falls to align strategies for managing features shared among them: Gill and Cayuga Creeks. Implementing these strategies will help to achieve improved habitat and water quality as well as mitigate flooding.

Map 4.6 Town of Niagara: Priority Areas for Protection



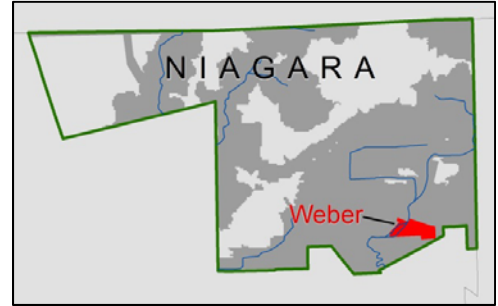
WEBER PROPERTY

Municipality: Town of Niagara

Acreage: 46.48 acres

Location: Porter Road

Ownership: Joseph C. Weber Inc.



Site Description: The group of parcels collectively referred to as the Weber Property is significant in the context of the Town of Niagara, City of Niagara Falls, and the Cayuga Creek corridor as well as in the name of establishing community and coastal resiliency. This large undeveloped area is surrounded by medium intensity residential development on three sides and the Niagara Falls International Airport and Air Reserve Station to the north. The parcels are significant in that they contain the largest tract of functional habitat within the town, and present great potential to contribute to the Greenway through both preservation of green space and the ability to be connected to other natural areas. The property is a mix of forested wetlands located in the northern portion of the site along with successional shrubland with grassland inclusions (Map 4.7). The primary tree species found in the forested wetlands are Green Ash (*Fraxinus pennsylvanica*), White Ash (*Fraxinus americana*), Red Maple (*Acer rubrum*), and Shagbark Hickory (*Carya ovata*). Shellbark Hickory, a state-listed species, has been reported to exist on the site by DEC staff. The early successional habitat, extending from the left descending bank (LDB) of Cayuga Creek into the eastern portion of the site, was once part of the floodplain prior to channelization of the creek. The approximately 1,500 foot linear stretch of Cayuga Creek that runs through the property is a deeply incised, trapezoidal channel with little-to-no connection to the adjacent historic floodplain. Due to flooding issues downstream, earthen berms have been constructed on both sides of the stream and the section that parallels the Cayuga Village Inc. Mobile Home Park has been hardened to help redirect the flow. A strip of successional woodlands with shrub understory separates the early successional grassland area from Elderberry Place and Cayuga Village. Invasive species are a threat to the site but generally are clustered in disturbed and fringe areas. Buckthorn was observed along the edge of the creek and in the wetlands. Other invasive plant species that occur on the site include: Mugwort (*Artemisia vulgaris*), Tatarian Honeysuckle, Phragmites, Purple Loosestrife, and Reed Canary Grass (*Phalaris arundinacea*). Dumping of trash, construction material, and unidentified fill material can be seen in the northwest portion and the southeastern corner of the site. In addition, informal trails have been created within the property boundaries as the result of off-road vehicles.

Conservation Strategy: Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

Proposed Action/Restoration Potential: The primary objective for this site is acquisition and long-term protection given the quality of habitat it contains and its significance within a stream corridor that has experienced development and lost much of its natural function. In addition, opportunities for habitat enhancement include stream alterations to mitigate flooding, enhancing habitat of amphibian populations, and addressing invasive species. Acquiring and establishing the Weber Property as a living infrastructure demonstration site will help the town in meeting multiple objectives related to natural resource protection, flood attenuation and mitigation, community and coastal resiliency, and recreation.

There are several mitigation options that would help reduce flooding and provide wetland and riparian habitat enhancement on the Weber Property. Design and construction of flow relief channels could be a cost-effective way to substantially benefit habitat and reduce flooding risk downstream. Another option is the realignment and reconfiguration of the existing stream channel to restore meanders. This would allow for energy and erosive forces during high flows to be better dissipated. Reconnecting part or all of the historic stream channel with its floodplain should be looked at as an option.

Specific needs and recommendation that will help to address flooding issues, provide habitat enhancement, and manage invasive species include:

- Reconnect the historic floodplain west of Cayuga Creek: Reconnecting the creek to the western floodplain is recommended because the elevation is lower and would require the least amount of earth moving (Map 4.8). This option would also provide the greatest potential for redirecting water and relieving flooding problems, as water would flow into the western floodplain with maximum potential for storage capacity. Depending on the frequency of inundation, the understory composition may shift to favor plants more tolerant of periodically wet conditions;
- Forested wetland in the northeastern quadrant: Increasing the availability of water in this section of the property could increase its capacity to support amphibian populations and specialist plant species. However, the creek's questionable water quality could potentially lead to degradation of this relatively high-quality habitat;
- Disturbed depressions and shrubland habitat in the southeastern quadrant: Habitat near the creek in this section is highly disturbed and contains many invasive species. Inundating this relatively small area could increase its ecological value. Depending on habitat enhancement objectives, it may be considered less desirable to permit water to flow eastward into the successional shrubland and the open area containing Closed Bottle Gentian (*Gentiana andrewsii*);
- Invasive plant control and management followed by introduction of native plants in all vegetation layers would enhance habitat and increase resistance to invasive plant recruitment and regeneration (Map 4.8); and,
- Emerald Ash Borer (EAB; *Agrilus planipennis*) has been identified in Niagara and Erie counties and is expanding across Western New York. EAB is a major threat to the habitat because Ash trees are a substantial component of the forest canopy and the loss of trees would daylight portions of the forest, further helping invasive plants establish and out-compete native plant communities. Measures to help protect existing Ash populations are needed as well as planting of non-Ash species to replace expected losses.

Potential Implementers/Partners: Town of Niagara, Buffalo Audubon Society, WNYLC, SUNY Buffalo State College

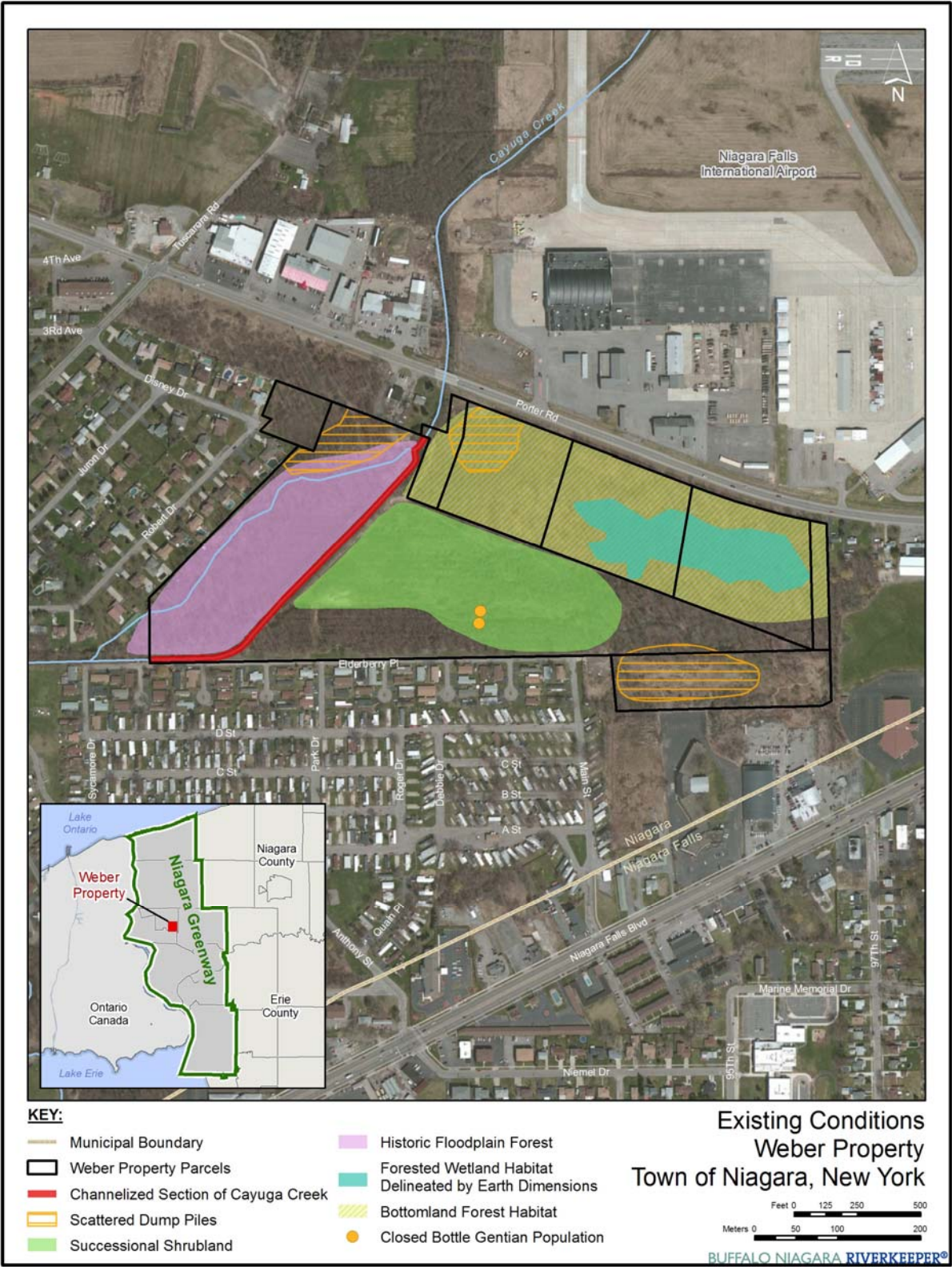
Potential Funding Sources: Great Lakes Protection Fund, Great Lakes Restoration Initiative, Community Forest and Open Space Program, Urban Waters Restoration Program, NYS Conservation Partnership Programs

Niagara River Greenway Habitat Conservation Strategy



Left: Forested wetland in the northeast portion of the Weber Property. Conservation or preservation is encouraged given the lack of similar habitat in surrounding areas within the Cayuga Creek watershed. Right: Successional grassland (right) and shrubland (left) in the southeastern section of the Weber Property. Invasive plant control and management followed by introduction of native plants would enhance habitat quality and increase resistance to invasive plant recruitment and regeneration.

Map 4.7 Weber Property: Existing Conditions



Niagara River Greenway Habitat Conservation Strategy

Map 4.8 Weber Property: Opportunities



Note: Reconnecting Cayuga Creek with its floodplain is one of the highest priorities for this site. This action would increase the overall health of the ecosystem and provide flood water attenuation. Additional opportunities include invasive species removal in locations depicted in the map.

4.3 City of Niagara Falls

Existing Conditions:

The City of Niagara Falls contains significant natural features like the Niagara Gorge and Falls, but most of the city's streams and habitat have been highly degraded as a result of urban and industrial land uses that are now in decay. The city is currently working to revitalize communities in a sustainable way that supports air and water quality and establishes long-term resiliency within the community.

Stream function: The downstream portions of Cayuga and Gill Creeks are located within the city. These portions of the streams are characterized as highly developed and both have been subject to manipulations like straightening and channelization that have caused them to be highly degraded. The mouth of Cayuga Creek flows into the Little Niagara River, located between the mainland and Cayuga Island.

Population: 50,193 (2010 census)

Annual Growth Rate: -9.71% (2000-2010)

Existing Institutional Framework:

Comprehensive Plan, 2009

Zoning Ordinance, 2009

Parks Master Plan, 2014

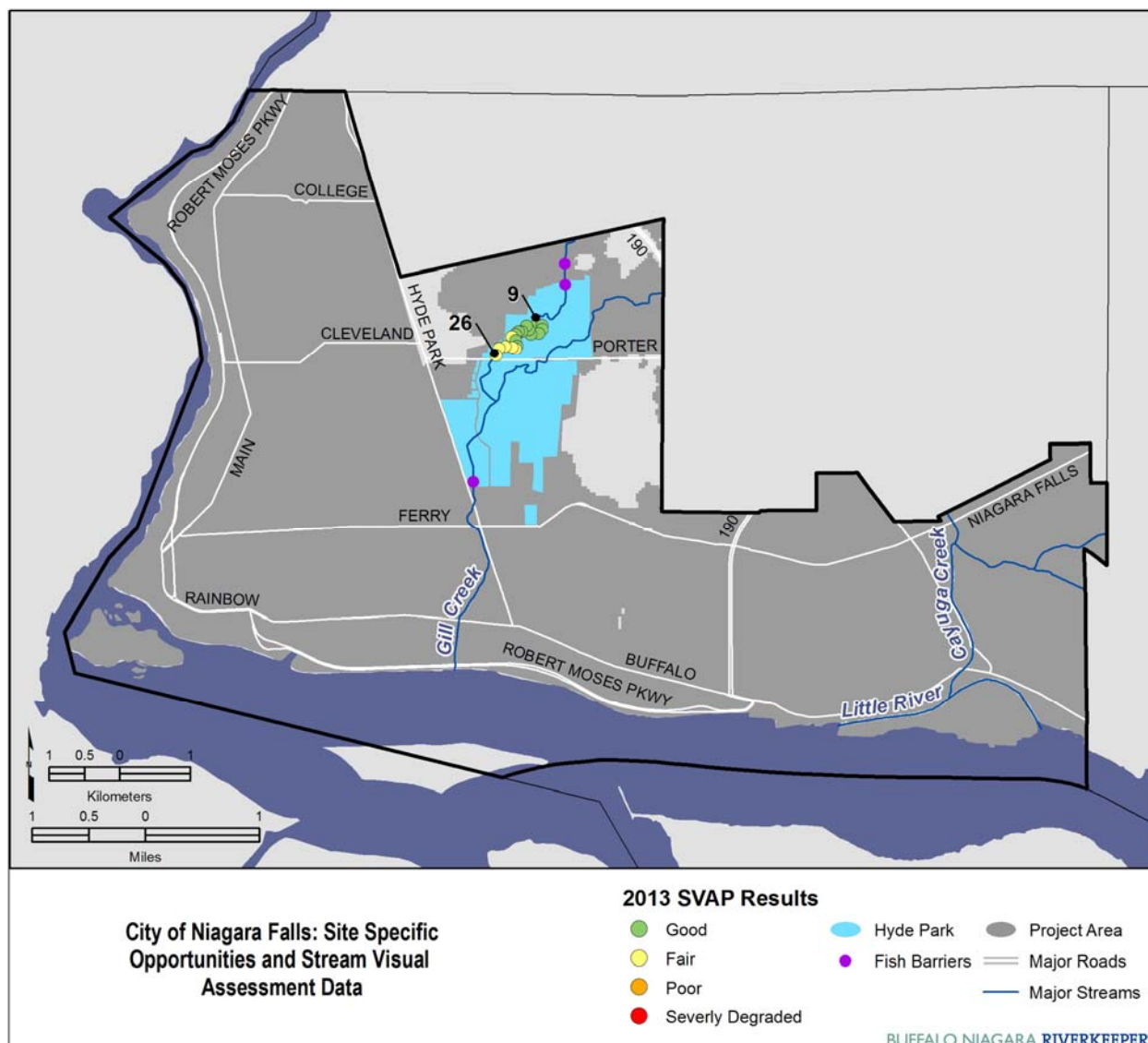
Recommendations:

Habitat in the City of Niagara Falls:

Total Municipality: 10,752 acres
Project Area: 8,510 acres (79.1% of municipality, 10.2 % of total project area)
NHD Streams: 16.9 miles
Coastline: 11.2 miles
Wetlands: 152 acres
Woodlands: 87 acres
Grass/Shrublands: 169 acres
Natural Areas: 408 acres

Recommendations for the City of Niagara Falls focus on creating improved habitat through future land use decisions that work to create a community that is revitalized and prioritizes environmental quality and natural resource restoration. Although much of the habitat within the city has been lost or degraded, there are opportunities to improve upon existing natural resources by implementing BMPs on public land, addressing barriers to fish, implementing living shorelines in areas that have been channelized or are experiencing erosion, and increasing stream buffers where possible. There is also opportunity within the city to creatively restore new habitat, especially on abandoned industrial and brownfield lands. Additionally, the city should focus on reducing flooding and overflow events and improving stormwater management. The following section details priority management actions for improving habitat within the city.

Map 4.9 City of Niagara Falls: Site-Specific Opportunities and Stream Visual Assessment Data



Note: SVAP data displayed corresponds to overall score for each Reach from 2013 assessment. Reach numbers roughly correspond to recommended actions along each stream.

Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

From the point where Gill Creek crosses into the city boundary, it is tunneled underground until it reaches an impoundment and flows south through Hyde Park. From Hyde Park Lake to its confluence with the river, it is largely channelized and surrounded in close proximity by industrial and residential land uses. The main opportunity for increasing stream buffers and creating living shorelines exists throughout Hyde Park. Although a portion of the creek travels through a well vegetated forested area, the remainder of the waterways and lakes within the park would benefit from increased buffers that would improve water quality, reduce temperatures, and provide improved habitat for aquatic and terrestrial species. Out of the

areas assessed during the 2013 SVAP, the last 4 reaches should be a priority for implementation of this strategy (Frothingham, 2014).

Although Cayuga Creek was not assessed as a part of the Strategy, a number of studies have been conducted to characterize the health of the stream and provide recommendations for improvements. Much of the floodplains, riparian areas, and wetlands along the creek have been converted to residential, commercial, and industrial uses (New York Power Authority and Gomez and Sullivan Engineers, P.C., 2006). Stream assessments completed in 2009 characterized the overall stream condition as poor due to streambank and channel erosion and resulting suspended sediment. These conditions stem from a loss of riparian vegetation, mowed lawns, and lack of in-stream habitat. The main method identified to address the problems along Cayuga Creek is the application of vegetated riparian buffers. This technique is recommended due to that fact that the stream is low energy, would address habitat concerns within the watershed, and is of lower cost and would cause less negative impact to the stream than heavy engineering techniques (Frothingham, 2009).

The city also includes a large amount of waterfront land along the Niagara River and Gorge. Although much of the land is owned by New York State Office of Parks, Recreation and Historic Preservation (OPRHP), the city should work with them to upgrade habitat along the shoreline after the Robert Moses Parkway is downgraded. Vegetated shallows along these areas provide important fish and wildlife habitat, especially in the context of the Important Bird Area, and would benefit from connections to natural habitat in upland areas. Native plantings along the gorge are also recommended as a means of enhancing ecological function.

Reduce stream barriers in areas of known or probable interference with aquatic life.

Three barriers to fish were identified along Gill Creek within the city (Map 4.9). The first barrier that fish traveling upstream from the river will encounter is at the dam located on the south side of Hyde Park Lake. This is a concrete dam that would not be feasible for removal; therefore, installation of a fish ladder or a side flow channel around the dam should be investigated in order to allow for passage. The second barrier is located at an impoundment at the north end of Hyde Park, which also presents water quality problems like high temperatures, lack of buffers, and potential runoff from upstream industrial lands that are unfavorable to aquatic species. An engineered rock riffle or side flow channel are recommended as potential mitigation measures at this site. The third barrier just upstream of the second is a culvert 670 feet in length, and is therefore not feasible for easily mitigating.



Dam at the south end of Hyde Park Lake.

Implement SVAP recommendations.

The area assessed within the city was located along a forested section of Gill Creek within Hyde Park (Reaches 9-26, Map 4.9). These reaches received low water appearance scores due to mostly silt and clay substrate along this portion of the creek. This area had a well-established riparian zone. However, the lower reaches would benefit from improvements to stream buffers especially along mowed areas. Conservation throughout the area assessed is a priority to preserve instream and upland habitat

conditions. The potential opportunity to remove a concrete dam located at Reach 13 was also identified during the stream assessment (Frothingham, 2014).

Increase habitat values of protected natural areas through improved management practices on public lands.

Hyde Park and Golf Course was identified as a priority for implementing habitat improvements through field work and conversations with city officials. The park (715.5 acres) features a golf course, baseball fields, picnic pavilions, and facilities for tennis, lawn bowling, and bocce. Hyde Park Lake, formed by a dam in Gill Creek at the southern end of the park is used for fishing. Natural areas within the park consist of several remnant forests and grasslands along Gill Creek that are isolated from other landscape features in the area. Despite their location, isolation, and small aerial extent, these areas represent urban habitat value for wildlife in an otherwise disturbed landscape. The potential for improving stream conditions, riparian areas, and creating living shorelines and additional wetland habitat were explored as part of the assessments completed through the Strategy. More detailed information about these opportunities is found later in this section.

In addition to the assessments completed through the Strategy, other efforts are ongoing to move forward with implementation of habitat improvements at the site. SUNY College of Environmental Science and Forestry students are currently developing detailed design solutions for the dam, shoreline restoration, and improving quality of Gill Creek corridor habitat. This location is also being explored for living shoreline implementation through the Niagara River Riparian Restoration Program.



Left: Extensive mowing and resulting erosion along Hyde Park Lake. Right: Priority area for wetland creation within the park.

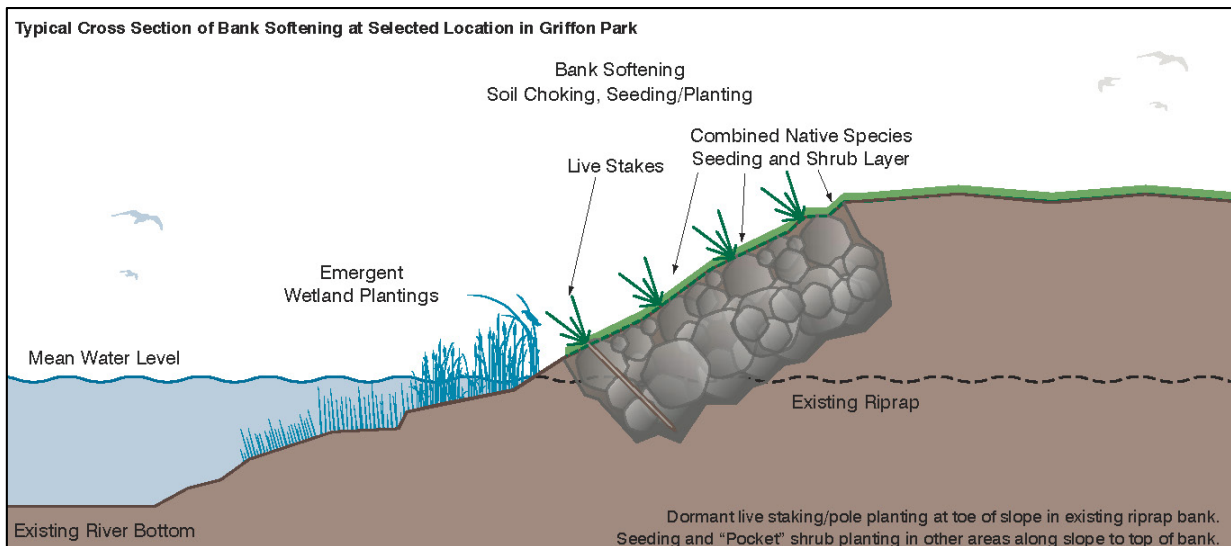
Two additional city-owned parks, Jayne and Griffon Parks, were identified as priorities for the use of funds provided by the Cooperative Agreement between Niagara Falls and the U.S. Fish and Wildlife Service. Detailed plans for implementation were developed in 2014 for inclusion in the Cayuga Creek Habitat Restoration Plan, and on-the-ground work is expected to take place in the next few years after a public comment period. Jayne Park, located on the north side of Cayuga Island is 20.4 acres in size and currently consists of mostly mowed lawn with features including a sledding hill, ball fields, and a memorial garden. Griffon Park, approximately 20 acres in size, is east of Jayne Park across from the upstream end of Cayuga Island. This park is also largely mowed lawn with walking paths and a playground. With funding from the Great Lakes Restoration Initiative and USDA Forest Service, Buffalo Niagara Riverkeeper has implemented some improvements to the park over the past several years including reforestation activities to reduce

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stormwater runoff and improve a public access point along with installation of forested garden beds. These efforts serve as a great start to increasing habitat value at this site. If future improvements are made to these parks it is important that a balance between providing public uses and wildlife habitat is created. Both sites offer extensive waterfront areas; therefore, it is a priority to maintain views and access to the water at designated points while simultaneously creating vegetated buffers of at least 100 feet in width and implementing living shorelines where they are lacking. It is also recommended that any new pathways use porous material.



Planned restoration features at Jayne Park (E & E, 2014a).



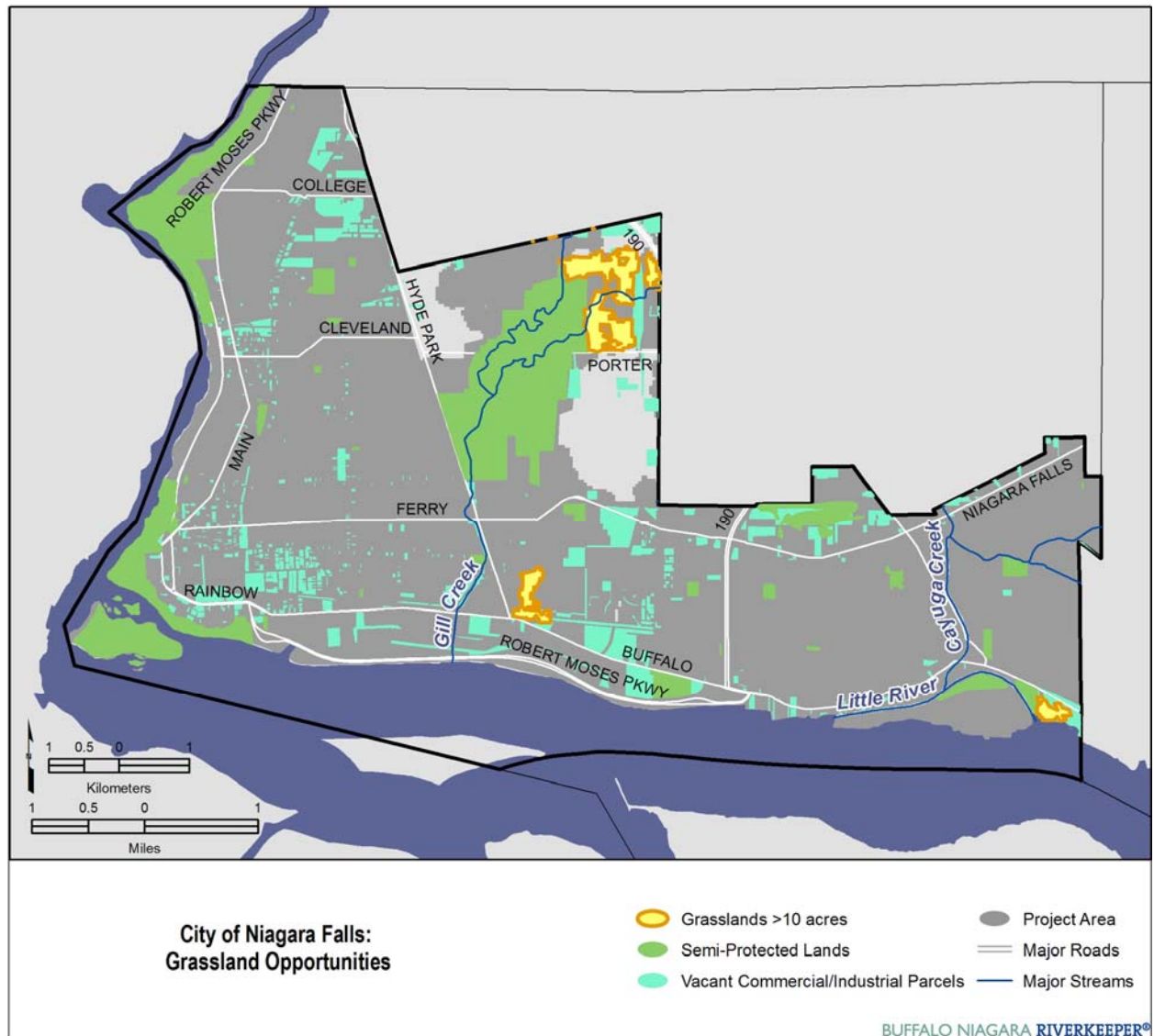
Bank softening and bioengineering at Griffon Park (E & E, 2014a).

Incorporate creation of native grassland meadows into remediation of landfills, brownfields, or other abandoned lands in the river corridor.

The City of Niagara Falls has several areas of large grasslands (>10 acres, using NOAA land cover data) that hold opportunities for connectivity to adjacent protected and vacant lands (Map 4.10). The priority for these grassland areas is for protection and management, utilizing native communities and mowing regimes beneficial to grassland bird species in decline within the region. The ability to expand and connect these grassland areas to adjacent lands should be explored as a secondary opportunity. Fee simple acquisition and/or the use of conservation easements should be explored to accomplish this recommendation. The large grassland area located to the north on Map 4.10 has potential to be connected to habitat within Hyde Park. The grassland just east of Cayuga Island offers connectivity to Griffon Park to the west and 102nd Street Landfill on the east. Connecting these areas of grassland would provide larger areas of habitat able to support a wider variety of species and help to improve grassland bird populations within the region.

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Map 4.10 City of Niagara Falls: Grassland Opportunities



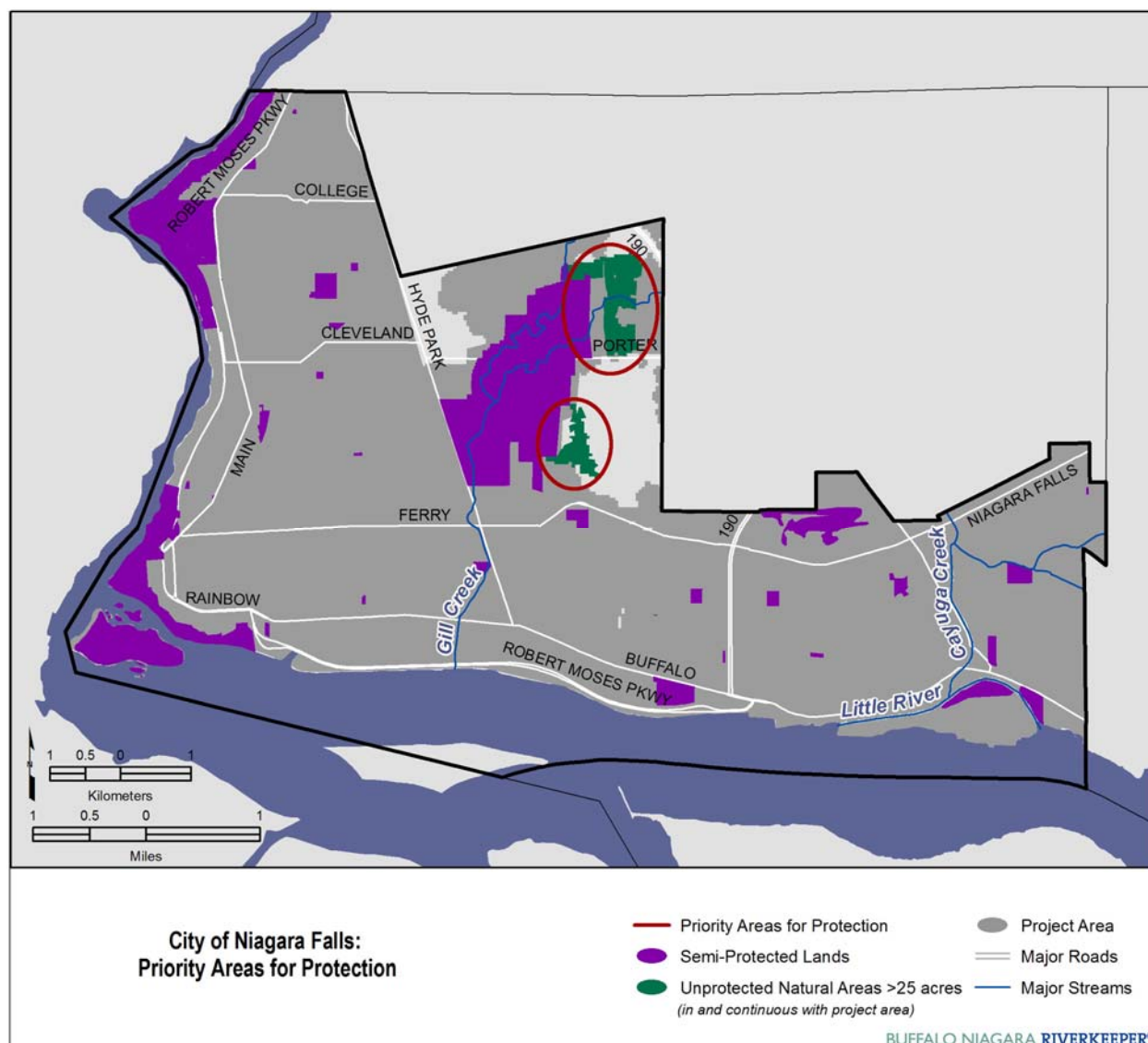
Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

An in depth analysis of the city's current regulatory framework was completed through the Healthy Niagara: Niagara River Watershed Management Plan (Phase 1) that should be referred to for comprehensive suggestions of improvements (Buffalo Niagara Riverkeeper, 2014a). Generally, in terms of habitat the city should strive to strengthen regulations regarding protection of streams and stream corridors, management of stormwater, and guiding new development to achieve revitalization in a sustainable manner that supports the quality of air and water. The Healthy Niagara Report suggests the following actions be taken by the city in order to promote ecological values of lands within their jurisdiction:

- Identify vacant and underutilized land in the city to reclaim and restore as buffers for urban creek systems, and incorporate the re-creation of wetlands, floodplains, and greenways;
- Upgrade the city's zoning code to implement sustainable practices that direct redevelopment away from the city's brownfield past and towards a more environmental "green city" image;
- Collaborate with the State of New York to implement a local ordinance consistency review for any state actions taken on waterfront lands within the Niagara Falls Coastal Zone;
- Develop zoning Conservation District overlays for Little Niagara River, Cayuga Creek, and Gill Creek to preserve and protect the creek corridors, implement riparian buffers and habitat protection (priority areas for protection are shown in Map 4.11);
- Incorporate performance standards or stricter regulations into zoning and site plan review ordinances in order to encourage low impact design, green infrastructure, and reduction of impervious cover in private development;
- Revisit the city's Local Waterfront Revitalization Planning process to address the changing waterfront and better guide its development;
- Train local boards and officials on low impact development and other green methods of development that protect water quality;
- Document green initiatives and practices initiated by municipal staff into formal program documents and policies in order to retain this departmental knowledge and efforts as staff change-over occurs;
- Develop outreach and educational materials for waterfront landowners that addresses better yard management practices, riparian buffer design, and how best to mitigate shoreline erosion;
- Strengthen zoning provisions that maintain and restore vegetative buffers in riparian areas, including shorelines, wetlands, floodplains, and special habitats, with preferences for native vegetation;
- Add zoning provisions to protect wetlands during site plan review;
- Provide additional shoreline protections to the Niagara River, Little Niagara River, and Gill Creek by increasing development setback distances, and include vegetation requirements; and,
- Collaborate with Niagara County Department of Economic Development (planning arm) to work with upstream communities and effectively plan for the community resiliency in regards to flooding issues.

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Map 4.11 City of Niagara Falls: Priority Areas for Protection



HYDE PARK

Municipality: Niagara Falls

Acreage: 715.5 acres

Location: Pine Avenue & Hyde Park Boulevard

Ownership: City of Niagara Falls



Site Description: Hyde Park is a large municipal park that primarily consists of mowed turf grass and recreational space including a 36-hole golf course, baseball field, hockey rink, picnic pavilions, along with facilities for tennis, lawn bowling, and bocce. The focal point of the park is Hyde Park Lake, primarily used for fishing and formed by a dam along Gill Creek at the southern end of the park boundary. The remaining natural habitat consists of fragmented patches of woodland and grassland with a few small wetlands that are all found in the northern section of the park, along the riparian corridor (Map 4.12). These riparian corridors provide habitat value for wildlife despite the fact that they are essentially isolated from other natural areas. The park is surrounded by residential, commercial, and heavy industrial land use in addition to multiple active railroad lines to the north. As a result of land use issues both within and outside the park, sediment loading and bank erosion problems are observed in and along Gill Creek.

Conservation Strategy: Increase habitat values of protected natural areas through improved management practices on public lands.

Proposed Action/Restoration Potential: The sheer size and management of Hyde Park largely as a recreational space, along with current maintenance plans provide extensive opportunities to improve the ecological function of the park. The opportunities investigated focus on improving the aquatic and riparian habitat along the Gill Creek corridor, and the creation of wetland habitat. The golf course provides an opportunity to create a model for balancing the economic use of land with conservation and resource protection. Such a model could incorporate regenerative stormwater features which serve as habitat, increased stream buffers to filter pollutants, integrated pest management plans, and areas of native meadows which both enhance habitat and create challenging, yet rewarding golfing experiences. It is recommended that a master plan be developed for the park, incorporating the following elements:

Riparian Habitat

A large amount of the riparian corridor in the golf course area is mowed and maintained as fairways to the top of the stream bank with the exception of the northern forested section that contains well established riparian vegetation. The predominant plant species in the forested riparian area include European Black Alder (*Alnus glutinosa*), Hawthorn (*Crataegus* spp.), and Rice Cutgrass (*Leersia oryzoides*). Swamp White Oak (*Quercus bicolor*) and Green Ash are also common tree species within this section. Communities of invasive plant species are a serious threat to the quality of the riparian corridor along Gill Creek; currently 20% of plants in the riparian areas are invasive species such as Tree of Heaven (*Ailanthus altissima*), Tatarian Honeysuckle, Common Buckthorn, and Glossy Buckthorn (*R. frangula*). If left alone, these invasive species have the capacity to spread beyond their current extent and impact all plant communities in the unmanaged landscapes in the park. The following opportunities exist for improving riparian habitat:

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- Plant and expand riparian corridors;
- Soften banks and complete riparian corridor restoration to create living shorelines. Riparian expansion should occur toward the northern end of Gill Creek (Map 4.13);
- Adjust the mowing regime along riparian areas to achieve a 50-100 foot naturally vegetated buffer from the top of the stream bank on both sides of Gill Creek. The buffer should be planted with native grasses, trees, shrubs, and monitored for the presence of invasive species;
- Create off-channel ponds in floodplain benches. These features add structural complexity, botanical diversity, and enhanced habitat for a variety of wildlife species that utilize the riparian areas; and,
- Control invasive species in the existing and created buffer area. Implementing invasive plant control in combination with the introduction of native plants in all vegetation layers will support early detection and suppression. These methods will enhance habitat and provide resistance to invasive plant recruitment and regeneration, as well as improve ecological function and resilience within the fragmented riparian corridor.

Aquatic Habitat

The section of the stream investigated for potential in-water restoration opportunities included the forest corridor north of Porter Road. In-stream conditions such as algal mats suggest an enriched environment most likely due to nutrient loading from surface water runoff as the result of fertilizer applications across the golf course. Other issues encountered include over-widened channels (Reaches 24 and 26, Map 4.9) and a low concrete dam located in the forested floodplain south of the concrete channel portion of Gill Creek (Map 4.13). Developing techniques to improve water quality on golf courses to address nutrient loading while maintaining the functionality of the course is an important action that if completed successfully could serve as a model for other courses in the region. Utilizing examples of resource protective courses successfully implemented in other regions of the country could serve as an important reference tool to facilitate the proposed alterations. The major opportunities for aquatic habitat restoration within the park are as follows:

- Habitat modification at Reaches 24 and 26 to enhance the in-stream habitat for fish and other aquatic species. Adding and placing in-stream structures such as logs and rocks would narrow the channel in these two shallow, wide, slow-flowing areas (Map 4.13). This would increase stream depth and velocity during low-flow periods and improve water quality by oxygenating the water and reducing thermal loading. The in-stream structures would also provide habitat for fish and wildlife; and,
- Remove the low, concrete dam along the forested section of Gill Creek (Map 4.12) to restore flow, and narrow the channel by placing spaced rocks along the banks at or just below summer flow levels to manage the thalweg and flow patterns (keep flows from being directed toward the stream banks), thus reducing erosion, maintaining stream bank stability, and supporting an intact riparian corridor and improved water quality through reduced siltation loading.

Wetland Creation

A potential area for wetland restoration and expansion exists along an intermittent tributary stream feeding into Gill Creek at the northeast end of Hyde Park Lake and south of Porter Road (Map 4.13). This area includes a wide, shallow, slow moving stream with banks 3-4 feet in height and a few reaches containing riprap. There is a small emergent wetland in the lowland area that is primarily recharged from

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the tributary and surface water runoff from the golf course. Mowing in this area to the top of stream bank is currently limiting the extent and hydrology of the wetland. Overall objectives for wetland creation within Hyde Park include:

- Expansion of the small wetland into a larger, more functional wetland by converting the turf grass area into a floodplain wetland populated with emergent or wet meadow plant communities (Map 4.13);
- Grading to lower elevations closer to the stream channel to increase interaction of groundwater with wetland plantings and increase periods of soil saturation, which will contribute to the creation of a living shoreline;
- The adjacent fairway or “rough” areas should be narrowed to accommodate the expanded wetland. This conversion can be designed to incorporate this habitat feature into the golf course as a water hazard or “rough” area without losing any fairway area. The establishment of vegetated wetland areas will slow overland sheet flow from upland areas to Gill Creek and support the filtration and retention of nutrients and other chemicals that are likely associated with turf grass management; and,
- Strategically placed logs or rocks should be installed to provide basking and resting areas for turtles and amphibians as well as perches for birds in the larger open water areas within the wetland.

Potential Implementers/Partners: USACE, City of Niagara Falls, SUNY College of Environmental Science & Forestry

Potential Funding Sources: Great Lakes Fishery & Ecosystem Restoration Initiative, USACE Authority, Greenway Ecological Standing Committee Funding, Resources and Matching funds from the City of Niagara Falls



Left: Potential wetland enhancement site south of Porter Road. Expansion of this small wetland into a larger more functional wetland could be achieved by converting the turf area into a floodplain wetland populated by emergent or wet meadow plant communities. **Right:** Excavated pond and wooden dam-like structure in the northeast corner of Hyde Park. The pond has some potential to support wetland fringe habitat and a vegetated buffer.

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Map 4.12 Hyde Park: Existing Conditions



Map 4.13 Hyde Park: Opportunities



4.4 City of North Tonawanda

Existing Conditions:

The City of North Tonawanda has a significant amount of habitat restoration and preservation potential with waterways comprising the majority of three of its borders, wetlands covering 1,175 acres (18% of total municipal project area), and hydric soils making up two-thirds of the municipal acreage (Map 4.15). Historically, industry and residential development within the city was primarily focused along the Niagara River but newer residential development has been expanding to the north and southeast. The majority of the remaining industrial land in the city is located on Tonawanda Island with most of the former industrial land being converted into parks and commercial water dependent uses. Although much of the land bordering Tonawanda Creek upstream of the Twin City Memorial Highway Bridge is owned by NYS Canal Corporation, the majority of it is maintained by the city as park space or by residents along Sweeny Street as private dock space.

Stream function: The lower section of Tonawanda Creek was significantly altered for shipping and transportation purposes. Residential development and recreational docks have further affected water quality and aquatic habitat. Small sections of Bull Creek and Sawyer Creek also border the city along the northeast corner (Map 4.14).

Population: 31,568 (2010 census)

Annual Growth Rate: -5.09% (2000-2010)

Existing Institutional Framework:

Comprehensive Plan, 2008

Local Waterfront Revitalization Plan (LWRP), 2013

Habitat in the City of North Tonawanda:

Total Municipality: 6,945 acres

Project Area: 6,472 acres (93% of municipality, 7.7% of total project area)

NHD Streams: 9.43 miles

Coastline: 4 miles

Wetlands: 1,175 acres

Woodlands: 198 acres

Grass/Shrublands: 60 acres

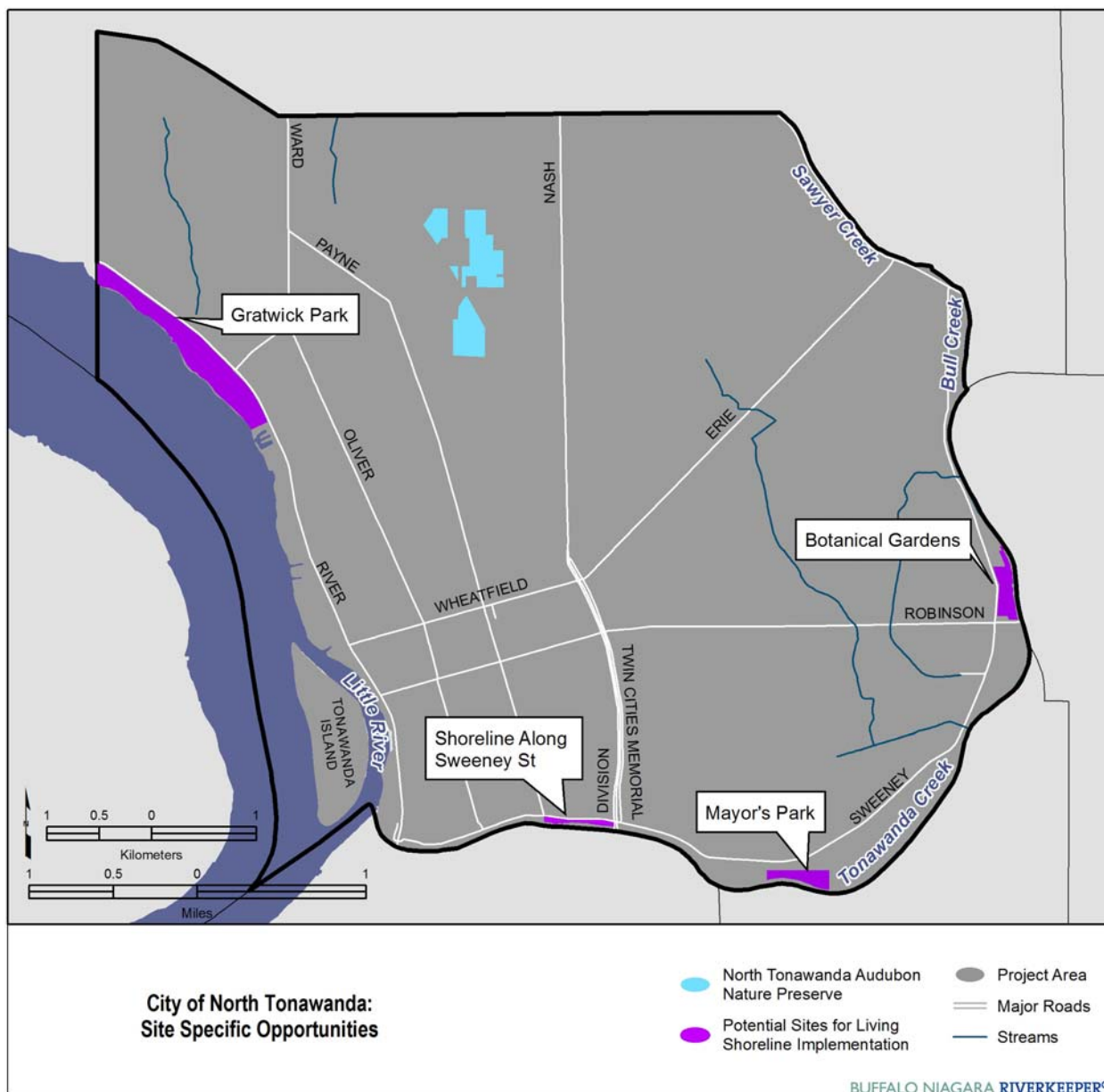
Natural Areas: 1,433 acres

Recommendations:

Protecting the City of North Tonawanda's water resources is the primary recommendation for habitat given the extensive amount of shoreline and wetlands within the city. Specifically, working to improve water quality and riparian buffers along streams and coastal areas along with protecting wetlands resources should be the focus of future habitat management. The major objectives for preserving habitat within the city are outlined in their planning documents:

- Ensure the sound management and protection of the shoreline, including land and waterside habitats, and the waterbodies themselves (LWRP, 2013);
- Ensure new development opportunities do not adversely impact existing natural resources (LWRP, 2013); and,
- Develop materials and programs that capitalize on the educational opportunities of the city's many wetlands and its waterfront (Comprehensive Plan, 2008).

Map 4.14 City of North Tonawanda: Site-Specific Opportunities



Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

The City of North Tonawanda has approximately 10 miles of shoreline along the Niagara River and Tonawanda Creek (LWRP, 2013). This acreage offers significant opportunities to improve riparian habitat, bank stability, water quality, and aquatic habitat.

Tonawanda Creek accounts for approximately 5 miles of the city's shoreline, the majority of which is owned by NYS Canal Corporation. Through Buffalo Niagara Riverkeeper's Niagara River Riparian Restoration Program, in collaboration with the city, several areas within public park spaces were identified

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as potential candidates for shoreline restoration work. Such areas included Mayor's Park, North Tonawanda Botanical Gardens, and a public recreational area along Sweeny Street at the foot of Niagara Street (Map 4.14). All of these areas would benefit from bank stabilization, planting of vegetation, invasive species management, and aquatic habitat restoration. Living shorelines techniques to accomplish these restoration objectives should be used whenever possible. Due to the fact that Hydrilla, an invasive aquatic plant species, is being treated over the next several years along Tonawanda Creek, implementation of these potential opportunities is not recommended until this treatment is completed due to potential impacts on surrounding aquatic plant species. In addition to working in public park spaces, opportunity exists to work with and educate waterfront landowners regarding BMPs for the maintenance of riparian areas and docks. One way to achieve this is through a series of public meetings for interested residents.

The Niagara River coastline within the city also provides opportunities to work within public spaces to improve aquatic and terrestrial habitat. Methods to create valuable shoreline habitat from hardened shorelines include grading to form a gentle slope along with the placement of vegetation and other natural materials in a manner that reduces erosion, provides habitat, and allows for access at designated locations. Efforts to improve shoreline areas have been completed along Gratwick Park and Gratwick Marina (Map 4.14); however, additional opportunities to improve shoreline stability and habitat exist at these sites. Additionally, the grassland area of the park that is a capped landfill could benefit from seeding and planting of native grassland plants to promote a more diverse habitat for bird species.



Gratwick Marina looking north.

A significant opportunity to create additional park space and promote the proper reuse of coastal resources exists on Tonawanda Island (Map 4.14). Approximately 40 acres of vacant industrial land on the island are located along a large portion of the Niagara River shoreline. Preliminary plans for the reuse of the island include mixed-use commercial and residential development in the central portions with a large public park to the north, connected by a waterfront pedestrian plaza (LWRP, 2013). Prior to construction it is recommended that the city incorporates ecological features and living shoreline techniques within the park space where possible. Additional efforts to protect aquatic habitat include carefully planning any new docks or marinas within the city. The Great Lakes Clean Marina Program provides resource to help communities with such efforts.

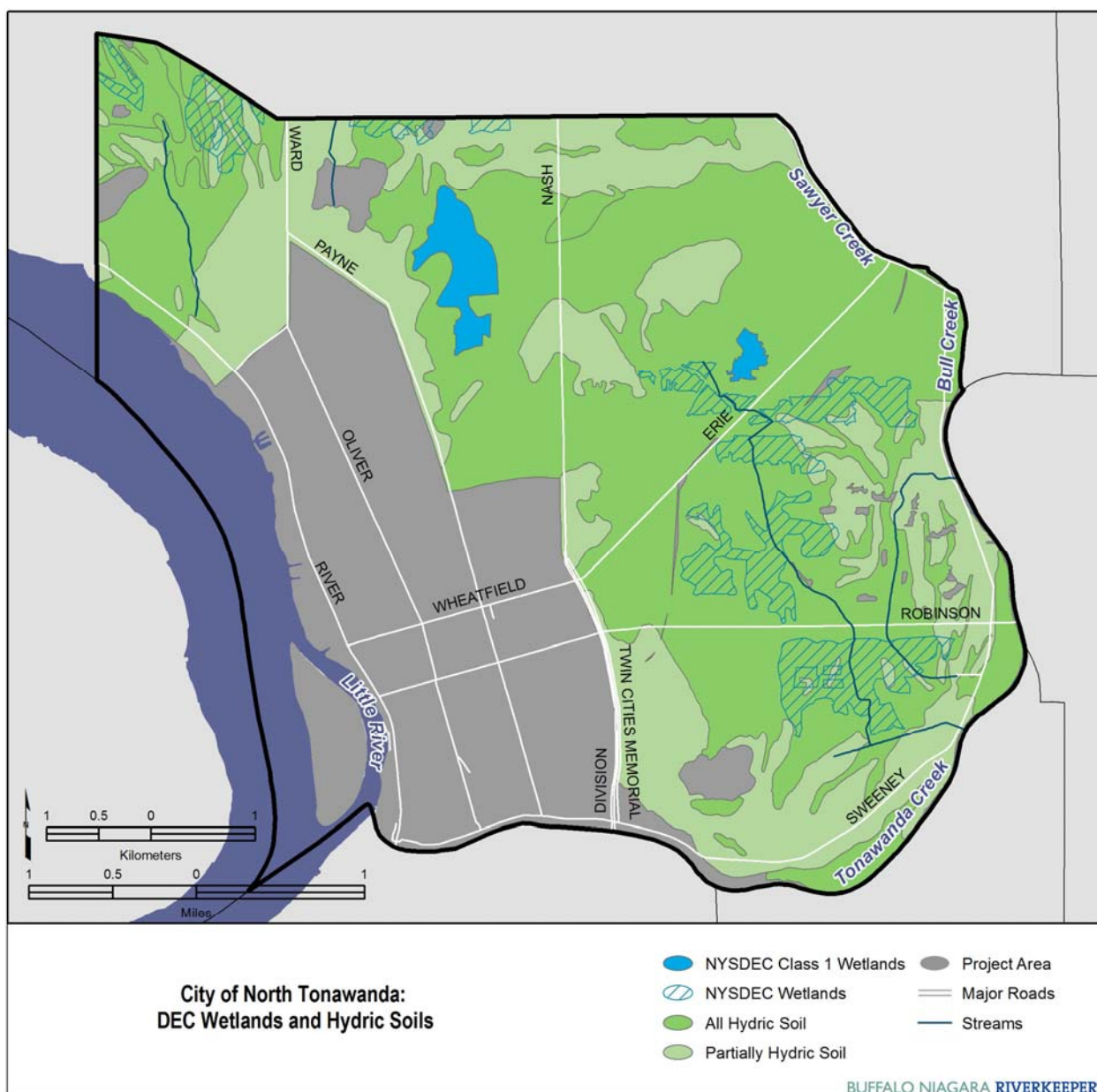
Work with public and private owners on best management practices to gain maximum ecosystem and economic values of wetlands including stormwater retention and filtration, native species diversity, and beauty.

Within the context of the Niagara River Greenway, wetlands make up a significant amount of the land in the City of North Tonawanda. DEC wetlands account for 462 of the total acres, 96 of which are DEC Class 1 wetlands: the third highest acreage of all the municipalities in the Greenway (Map 4.15). Several of the remaining unprotected natural areas within the city are associated with the presence of wetlands,

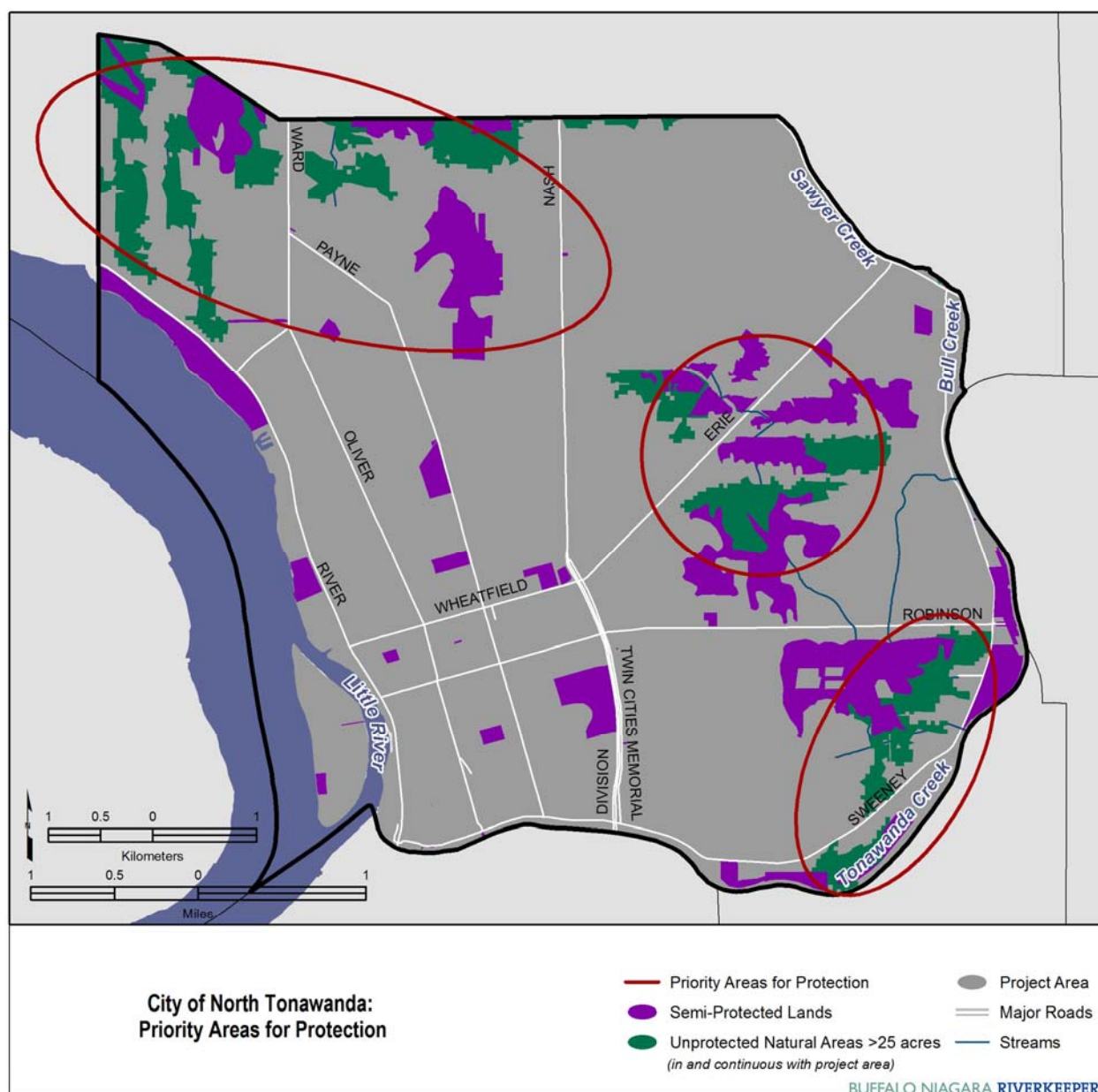
representing the priority areas for protection of existing natural resources (Map 4.16). It is recommended that the city and other local partners develop education and outreach materials targeted to residents with wetlands located on their properties, and consider creating incentive programs for protection such as conservation easements or tax value-assessment programs for wetland preservation.

The North Tonawanda Audubon Preserve provides a great model for conservation and should be the focus of future efforts. This 75-acre nature preserve is significant in the fact that it contains high quality forested wetland and is located within a mostly developed area. The priority actions for this site include: expansion to preserve surrounding parcels where possible; actions to prevent and manage invasive species; and address other factors that threaten the quality of the site (such as deer herbivory and the spread of EAB).

Map 4.15 City of North Tonawanda: DEC Wetlands and Hydric Soils



Map 4.16 City of North Tonawanda: Priority Areas for Protection



Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, steam corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

A review of the North Tonawanda's current regulatory framework was completed as part of the Healthy Niagara: Niagara River Watershed Management Plan (Buffalo Niagara Riverkeeper, 2014a). Based on this review it was recommended that the city focus on ensuring responsible development of its waterfront resources and the protection of its waterways. This can be achieved through implementing recommendations outlined in existing planning documents and, when necessary, updating and strengthening them. Particular emphasis is given to practices which carefully plan new development to

incorporate green infrastructure and vegetative buffers, as well as provide education and outreach to municipal officials and residents on such practices. The following is a more detailed list of recommendations from the Healthy Niagara Report:

- Implement many recommendations from existing planning documents that aim to protect water quality and ensure waterfront development occurs appropriately;
- Update the city's Local Waterfront Revitalization Plan to address the changing waterfront and better guide its development;
- Train local boards and officials on low impact design and other green methods of development that protect water quality;
- Document green initiatives and practices initiated by municipal staff into formal program documents and policies in order to retain this departmental knowledge and efforts as staff change-over occurs;
- Develop outreach and educational materials for waterfront landowners that addresses better yard management practices, riparian buffer design, and how best to mitigate shoreline erosion;
- Strengthen zoning provisions that maintain and restore vegetative buffers in riparian areas, including shorelines, wetlands, floodplains, and special habitats, with preferences for native vegetation;
- Incorporate performance standards or stricter regulations into zoning and site plan review ordinances in order to encourage low impact design, green infrastructure, and reduction of impervious cover in private development;
- Adopt a Clean Marina citizen education program to improve management of private marinas and docking facilities;
- Implement marina design and maintenance BMPs into the waterfront overlay. Legally the city has jurisdiction 1100' out into the river and can pursue their regulatory authority;
- Create regulations to oversee appropriate site design for small private docks along Tonawanda Creek;
- Add provisions to the Freshwater Wetlands ordinance that specify in what capacity the City Council will carry out the intent of this regulation. Cross reference this statute to other areas of the zoning code to better protect wetlands;
- Apply an Environmental Protection Overlay to sensitive environmental areas in order to provide enhanced protections. One priority area for application of an overlay is all parcels that are within and surrounding Klydel Wetland (DEC wetland TE-15) due to the fact that they are zoned for residential development;
- Provide additional shoreline protections to the Niagara River, Tonawanda Creek, and Tonawanda Island by increasing development setback distances and maintaining consistent setbacks throughout the entire shoreline (despite varying zoning districts); and,
- Collaborate with Niagara County Department of Economic Development (planning arm) to work with upstream communities and effectively plan for the community resiliency in regards to flooding issues.

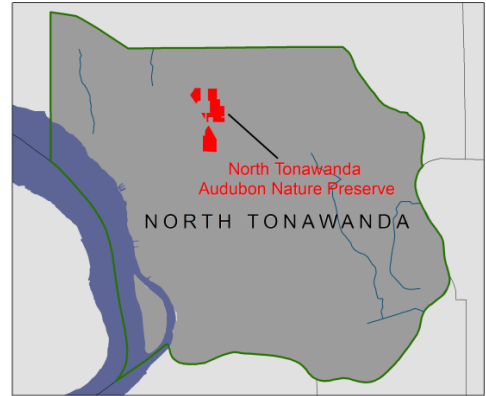
NORTH TONAWANDA AUDUBON PRESERVE

Municipality: City of North Tonawanda

Acreage: 75 acres

Location: Raymond and Birch Streets

Ownership: Buffalo Audubon Society & Western New York Land Conservancy



Site Description: Klydel Wetland is a Class 1 wetland that is significant in size given its location in a predominantly residential area. The North Tonawanda Audubon Nature Preserve (Preserve) protects several parcels within the area that generally coincide with Klydel (Map 4.17). The parcels consist of predominantly forested wetland with upland inclusions and upland areas along some of the edges of the site. Ditch-like drainage channels convey water at various times throughout the growing season; yet, the majority of the site is not considered to be drained (Map 4.17). The ecological cover type is comprised primarily of mature forest and some trees are reportedly greater than 180 years old. Numerous irregular upland inclusions and hummocks can be found throughout the site. These areas support small communities of upland vegetation. There are walking and hiking trails in the Preserve as well some evidence of ATV use that appears to stem from an access point in the north portion of the property.

Conservation Strategy: Work with public and private owners on best management practices to gain maximum ecosystem and economic values of wetlands including stormwater retention and filtration, native species diversity, and beauty.

Proposed Action/Restoration Potential: Though the site is considered to be a well-functioning forested wetland, several stressors pose a threat to its integrity. Addressing concerns that affect plant diversity (e.g. managing invasive plant species and herbivory by deer) should continue to be a major conservation focus of the preserve. Additional acquisition is another priority for the site that would allow for the further protection of lands to help prevent urban encroachment and other disturbances. Working with and educating surrounding landowners about the importance of this area would aid these efforts.

The following actions are recommended to support restoration, enhancement, and protection of the site:

- Control and manage Common Buckthorn, particularly along the western, southern, and southeastern borders of the site in order to control and eventually remove the seed bank source (Map 4.18);
- Suppress or eradicate the relatively small amount of Multiflora Rose and Honeysuckle mostly along the outer edges of the site (Map 4.18);
- Plant a native shrub understory to limit the encroachment of Buckthorn and other invasive species within treated areas and along outer edges and boundaries;
- Create a vegetative buffer across the site to suppress future recruitment of invasive plants, enhance habitat, screen residences (especially along Meadow Drive), and restrict access by motorized vehicles including ATVs;

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- Use shade-tolerant shrub species, such as Alternate Leaved Dogwood (*Cornus alternifolia*) and Spicebush (*Lindera benzoin*), along the Preserve's boundary and in the interior;
- Use BMPs to regenerate the forest. Practices may involve controlled thinning of Ash trees to allow restoration of hardwood, mast crop producing trees;
- Plant deer-resistant native shrubs such as Spicebush and Northern Bayberry (*Myrica pennsylvanica*) in woodland openings and along Meadow Drive to create a natural screen and buffer between the preserve and residential backyards. Preemptive Ash tree removal in this area would allow restoration planting;
- Improve public access (boardwalks) and provide educational programming in order to increase stewardship at the site;
- Introduce hardwoods and provide protection from deer browsing throughout the site to support wildlife and provide future canopy, with the recommendation of bare root or balled and burlapped 1.5-inch to 3-inch caliper nursery stock. Protection of planted material from herbivory is a necessity;
- Engage DEC wildlife biologists to assist in developing a deer management plan for the site; and,
- Provide restoration plantings in areas where invasive species control and management occurs.

Potential Implementers/Partners: WNYLC, Buffalo Audubon Society

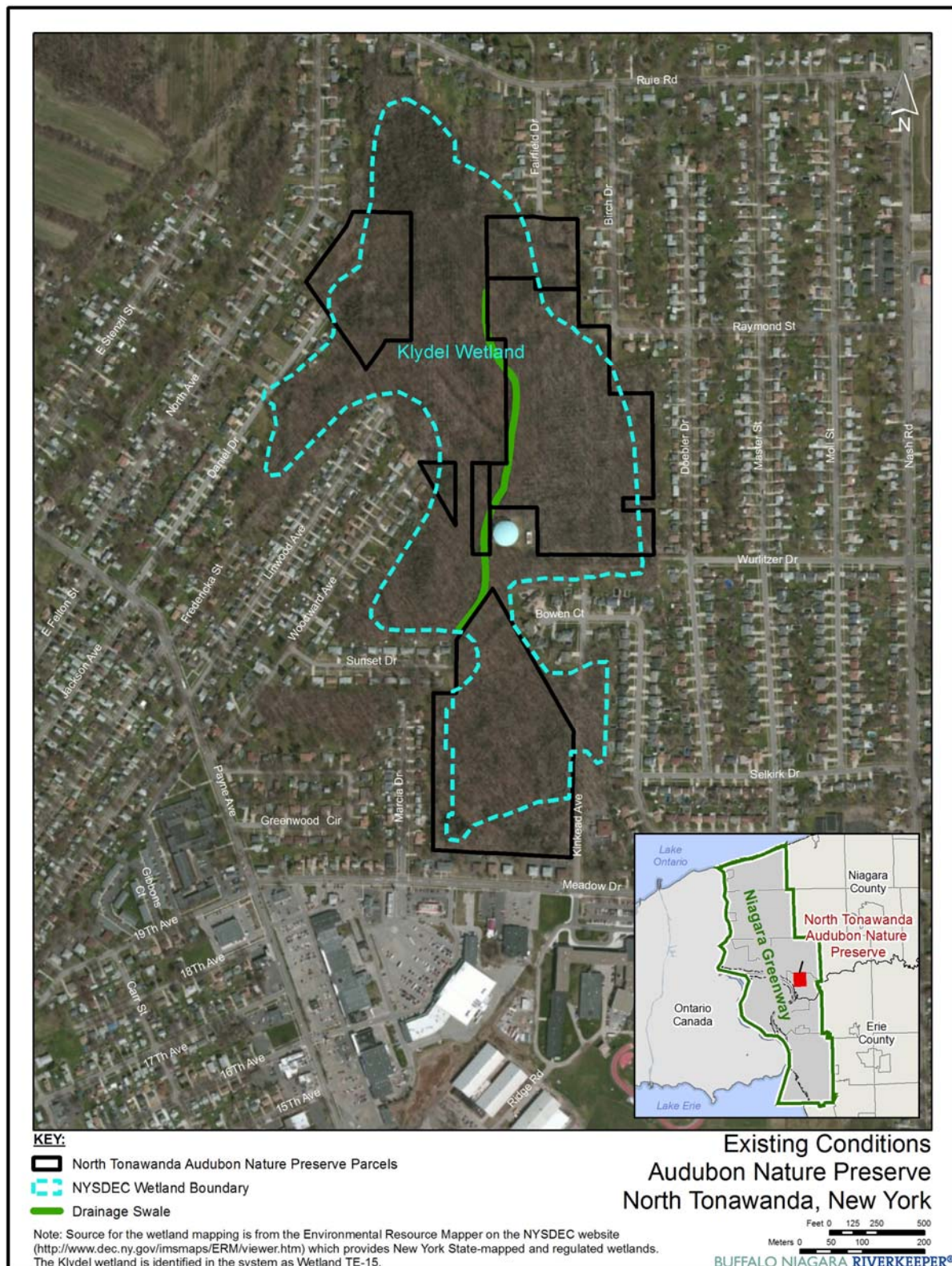
Potential Funding Sources: Greenway Ecological Standing Committee, USFWS Habitat Enhancement and Restoration Fund, Great Lakes Restoration Initiative- Partners for Fish and Wildlife, Environmental Protection Fund



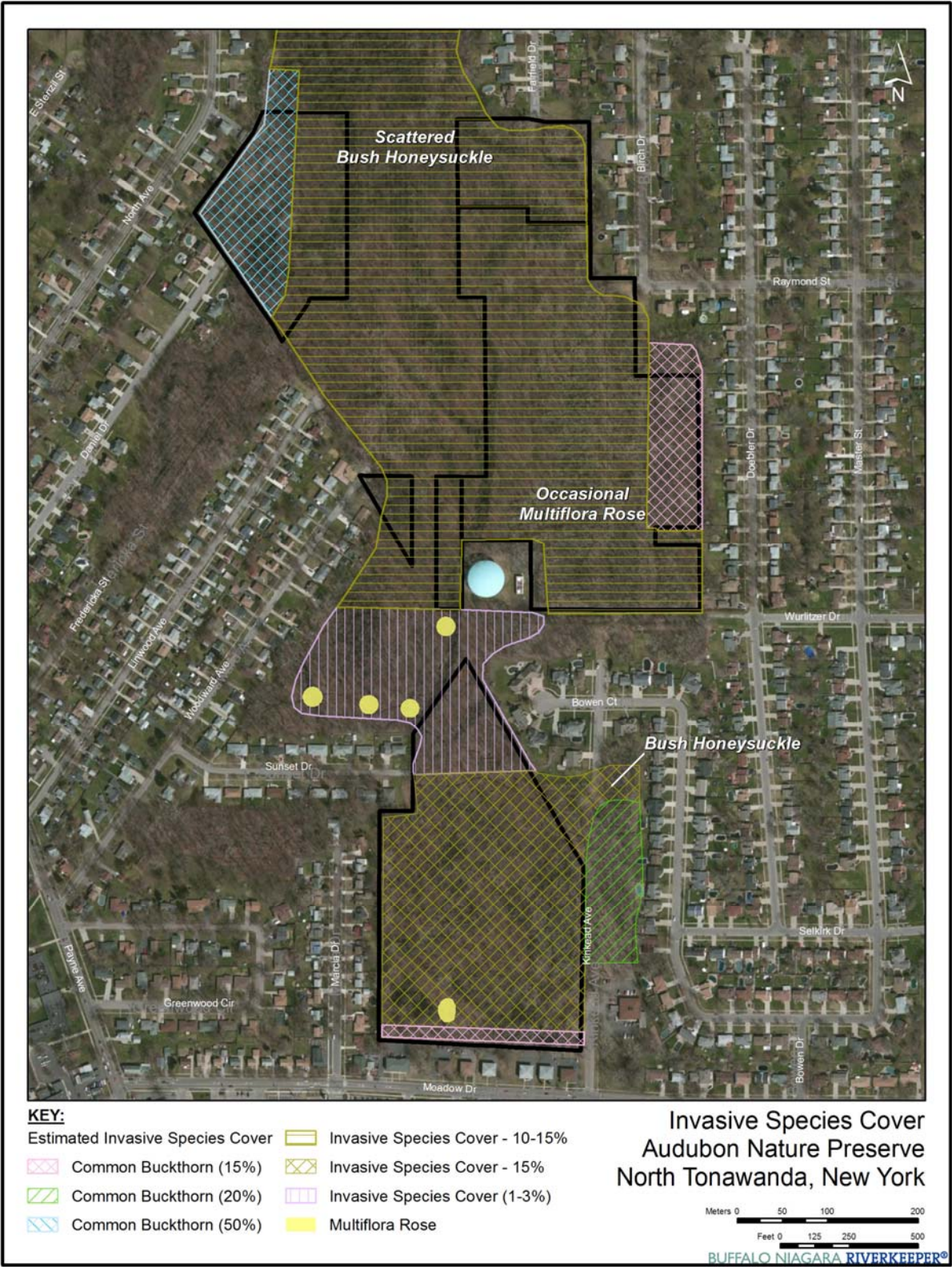
Left: Shallow drainage within the Klydel Wetland/North Tonawanda Audubon Nature Preserve. Right: Shallow ponded area within forested wetland, which provides valuable habitat for amphibians and other wildlife.

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Map 4.17 North Tonawanda Audubon Nature Preserve: Existing Conditions



Map 4.18 North Tonawanda Audubon Nature Preserve: Invasive Species Cover



4.5 Town of Porter & Village of Youngstown

Existing Conditions:

The Town of Porter is an agriculturally based, bedroom community. A significant feature of the town is it's the vast amount of waterfront land along the Niagara River and Lake Ontario, which is important from both an environmental and economic viewpoint. The Village of Youngstown is nestled just south of Fort Niagara State Park. Recommendations for the village are included in this section due to its size and location in relation to the Town of Porter.

A small amount of the total municipality falls within the project area due to the fact that many of the streams empty directly into Lake Ontario and therefore are not part of the Niagara River Watershed. Despite this, significant areas of habitat exist within the town and village project area including critical headwater forest, grasslands, and wetlands.

Population: Porter: 6,771, Youngstown: 2,701 (2010 census)

Annual Growth Rate: Porter: -2.15%, Youngstown: 30% (2000-2010)

Existing Institutional Framework:

Porter: Comprehensive Plan, 2004, Zoning Plan, 2010
Youngstown: Local Water Front Revitalization Plan, 1990 (currently being updated), Zoning Code, 1998

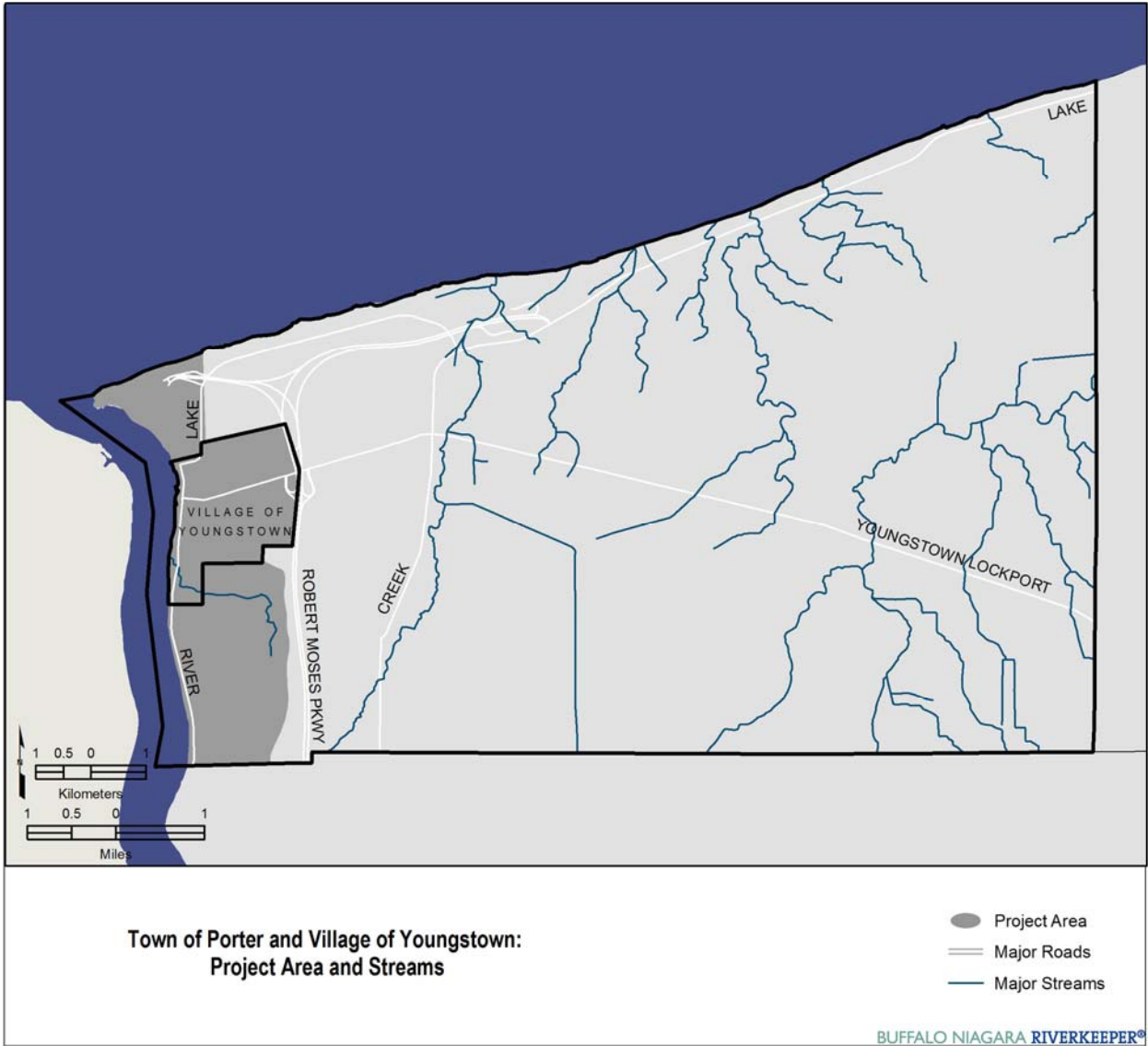
Habitat in the Town of Porter & Village of Youngstown:

Total Municipality: 21,472 acres
Project Area: 1,874 acres (9% of municipalities, 2% of total project area)
NHD Streams: 92.6 miles
Coastline: 3.9 miles
Wetlands: 334 acres
Woodlands: 552 acres
Grass/Shrublands: 134 acres
Natural Areas: 1,020 acres

Recommendations:

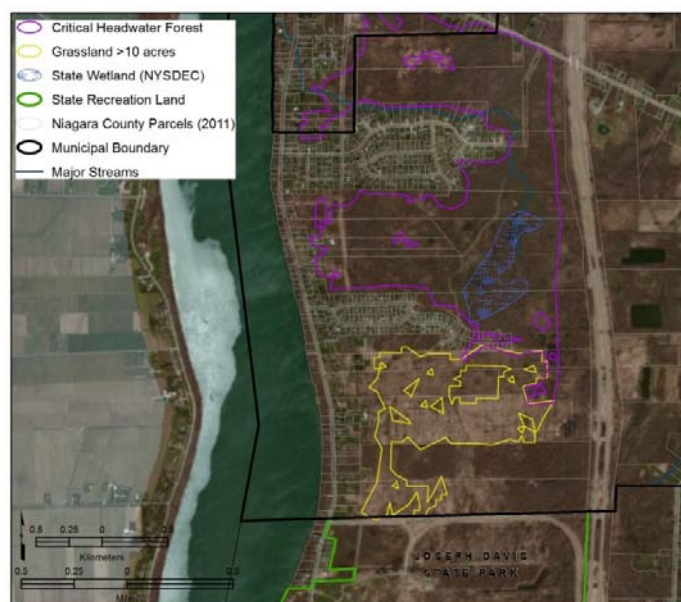
Future growth within the Town of Porter and Village of Youngstown should be carefully considered to preserve existing areas of open space and shoreline condition. Management on public lands is another priority for habitat enhancement within the town, along with the protection of natural areas that expand and connect already protected lands.

Map 4.19 Town of Porter and Village of Youngstown: Project Area and Streams



Work with municipalities, land conservancies, and private owners to transform vulnerable woodlots into functional, resilient forests through protection and connection of existing lots.

The town and village contain 387 acres of critical headwater forests located within lands that are primarily unprotected. It is important that these areas are protected from development. Map 4.20 shows an overview of critical headwater forests and other unprotected natural lands that are priorities for action under this strategy. Opportunity also exists to expand upon already protected lands, namely Joseph Davis State Park located just south of the municipal boundary. An ongoing, in-depth assessment of properties for sale within this area should be conducted in order to move forward with placing protections on these lands. It should also be noted that land prices within the municipalities are much higher than other locations in the watershed. A dedicated funding source should be made available for lands that are a priority for protection due to their ecological significance within the Greenway, as often times this is a limitation for protecting these lands.



An in-depth view of priority areas for protection that could also potentially create connectivity to protected areas like Joseph Davis State Park. The threat of conversion to sub-divisions can be seen in some areas that have already been developed.

Increase habitat values of protected natural areas through improved management practices on public lands.

Fort Niagara State Park is a historical site strategically located on the confluence of the Niagara River and Lake Ontario. Given its placement along the northern border of the Town of Porter, Niagara River Greenway, Niagara County, and across the river from Niagara-on-the-Lake, the park plays a significant role as gateway to the region. Much of the site is maintained as park land but there is potential for improved management to maximize habitat value. Historically this area consisted of forested oak savannah habitat. Out of the 283 acres within the park, currently approximately 20% exists as forested cover.

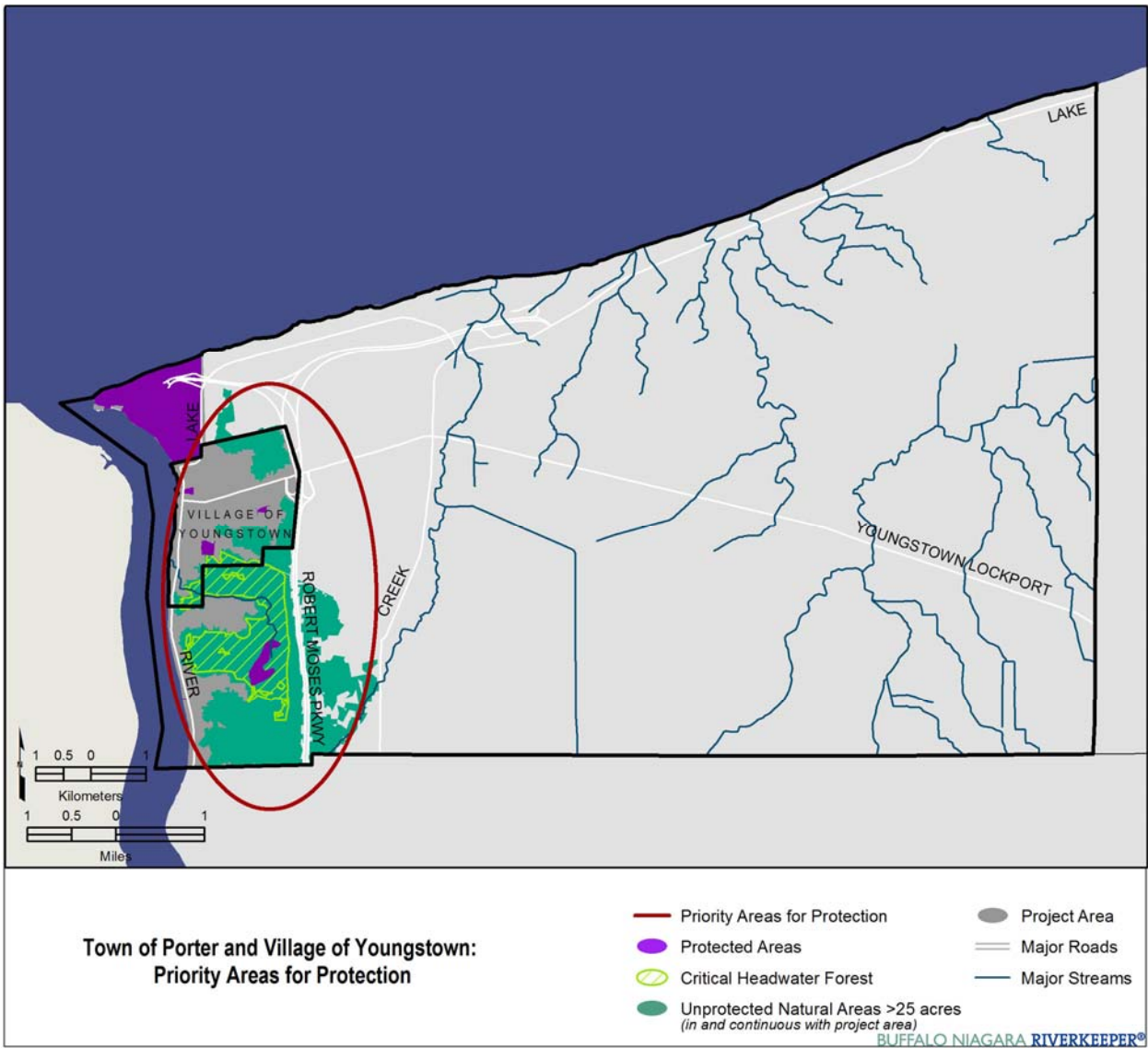


An aerial view of Fort Niagara State Park.

It is recommended that the remaining forested areas within the park are protected and restored to their historical quality to the furthest extent possible. Mowed areas should also be minimized and buffers created around sensitive environmental features. Management within the park should promote natural shoreline conditions and improve in-water habitat. Replanting

riparian areas with low vegetation could be used to preserve views while providing shoreline stability and ecological value. Referencing the work of the Niagara Peninsula Conservation Authority, the entity responsible for managing and maintaining the land along the Canadian side of the river, Fort Niagara State Park could consider implementing an oak savannah restoration project that mirrors the work within Canada. A project of this type would not only implement habitat restoration but also encourage and facilitate a joint US/Canada project effort and serve as an important cross-border outreach tool.

Map 4.20 Town of Porter and Village of Youngstown: Priority Areas for Protection



Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

It is important for the Town of Porter and Village of Youngstown to work together in order to align efforts regarding management of shared habitat features. The priority action for these municipalities should be to guide future growth in a manner that preserves important habitats like vulnerable wooded lots and shoreline areas. This can be achieved through the adoption of ordinances that implement setbacks, environmental protection overlay districts, incentive zoning, and performance standards. As mentioned in the Town of Porter Comprehensive Plan, the purchase of easements and/or land along the waterfront is another valuable tool in taking action to protect these lands. Shoreline areas should be carefully managed to prevent degradation or alteration of natural conditions. Allowing for access to the waterfront for fishing and recreation is also an important objective for the town and village that should be done in a manner that prevents impacts to shorelines and aquatic vegetation. Implementing soft engineering techniques and setbacks for development and mowing of vegetation are all tools that could be used to protect shoreline habitat. Preserving and enhancing this habitat would also greatly benefit migratory birds traveling along the Niagara River Important Bird Area. See Chapter 3 (Strategy 13) for more detailed information on these regulatory tools.

4.6 Town of Wheatfield

Existing Conditions:

Wheatfield has great potential for conserving significant habitat features within the Niagara River Greenway. After the Town of Grand Island, the Town of Wheatfield has the largest acreage of wetlands and natural areas within the Greenway project area (17% and 14% respectively). Farmland also provides habitat conservation opportunities, with 47% of the project area within the town identified as “cultivated land” or “pasture/hay” (NOAA, 2010). However, farmland, woodland, wetlands and natural areas are all at risk of development given Wheatfield’s desirable location along the Niagara River.

Stream function: Due to the fact that a majority of the town consists of low-lying wet areas, flooding occurs often. Major streams within the town include Black Creek, Sawyer Creek, the mid-section of Bergholtz Creek, and portions of Cayuga and Bull Creeks.

Population: 18,117 (2010 census)

Annual Growth Rate: 2.8% (2000-2010)

Existing Institutional Framework:

Greenspace Master Plan, 2015

Local Waterfront Revitalization Plan, 2012

Comprehensive Plan, 2004

Zoning Master Plan, updated in 2000

Recommendations:

Habitat in Wheatfield:

Total municipality: 18,446 acres

Project area: 15,469 acres (84% of municipality, 18% of total project area)

NHD Streams: 51.6 miles

Coastline: 2.7 miles

Wetlands: 2,528 acres

Woodlands: 620 acres

Grass/Shrublands: 79 acres

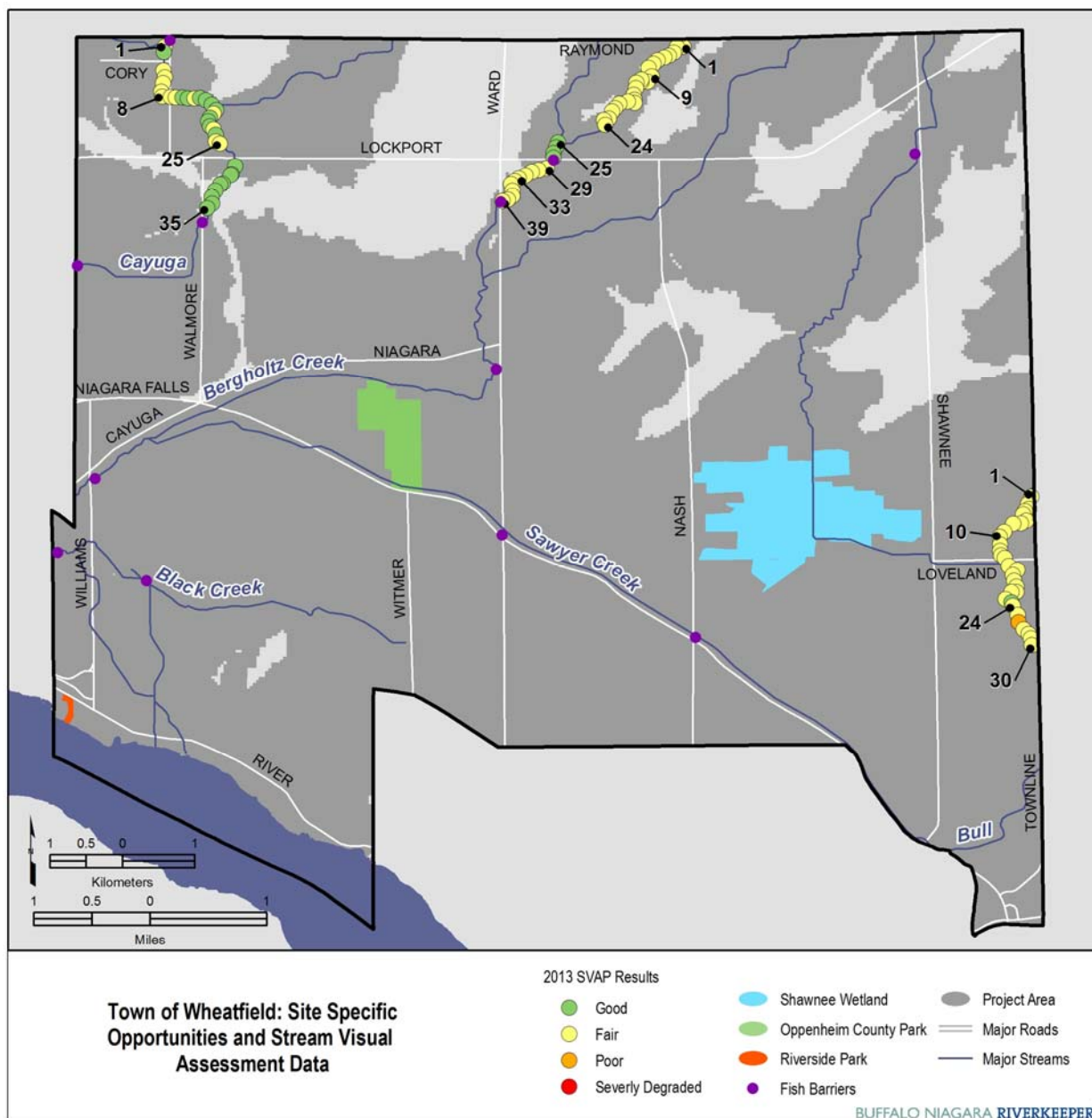
Natural Areas: 3,227 acres

After reviewing current habitat within the town, assessing the threats to natural resources, and talking with municipal officials, priorities within the town focus on preserving existing unprotected habitat that is significant within the Greenway, addressing problems along waterways (i.e. flooding and invasives), and planning for the future of the town as increasing pressure for development occurs. The following strategies and opportunities should be the focus of future natural resource management for the Town of Wheatfield. Site-specific opportunities mentioned here are detailed more fully later in the section.

Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

Buffering of streams is a priority action needed to address flooding issues and increase the quality and stability of waterways throughout the town. Management and restoration of stream buffers, also referred to as riparian areas, has been shown to be one of the most effective methods to protect multiple resources including water quality, natural communities and unique species, hydrology, and watershed ecosystem function (Hawes and Smith, 2005). Connectivity of waterways to riparian buffers, floodplains, and wetlands also provides water retention that reduces flooding associated with extreme storm events.

Map 4.21 Town of Wheatfield: Site-Specific Opportunities



Note: SVAP data displayed corresponds to overall score for each Reach from 2013 assessment. Reach numbers roughly correspond to recommended actions along each stream. Cayuga: riparian zone conservation and invasive species management along entire assessed reach, environmental education and shoreline sweep along Reaches 1-8, and riparian zone improvements along Reaches 1-25. Bergholtz: riparian zone conservation along Reaches 1-28, environmental education for Reaches 1-24 and 29-39, shoreline sweep opportunities and riparian zone improvement along Reaches 29-39, shoreline stabilization for Reaches 33-39, and debris jam removal at Reach 9. Bull: invasive species management and riparian zone conservation along entire assessed reach, shoreline sweep along Reaches 25-30, riparian zone improvement for Reaches 24-26, and removal of debris at Reach 10. Refer to Recommendations section for more detailed information. Reference section 1.3 for more background information on SVAP data collection.

Niagara River Greenway Habitat Conservation Strategy

Stream Visual Assessment results concluded that waterways within the town would benefit from riparian zone improvements (i.e. planting to increase widths) in the following locations: Bergholtz section between Lockport Rd. and Ward Rd. (Reaches 29-39), Bull Creek between Loveland and Townline Roads (Reaches 24-26), and Cayuga Creek from Cory Drive to Lockport Road (Reaches 1-25). Areas where bank stabilization should be addressed were noted along Bergholtz in the section between Lockport and Ward Roads (Reaches 33-39). Increasing the riparian zone may be all that is necessary to provide increased bank stability to the moderately unstable reaches in this section (see Map 4.21 for reach locations; Frothingham, 2014).



Left: Cayuga Creek reach 25, Right: Bergholtz Creek reach 34.

Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Protecting and linking natural areas along the waterfront is an important objective related to the creation of a Greenway that is essential not only for providing a pathway of trails accessible to the public, but also for creating connectivity between habitats that is important for resiliency and the species that use both land and water habitats.

A priority for the Town of Wheatfield is creating a connection to the Greenway Trail through the municipality. The town has a portion of the funding needed for design of the trail and implementation of a portion of it; however, additional funding is needed to complete this effort. The trail would run along an abandoned railroad. Areas of publicly-owned land surrounding the planned area for the trail present potential to preserve or restore habitat and provide scenic outlooks for the public. These parcels are shown in Map 4.22. The area highlighted in the inset includes a prime location to create waterfront access that is owned by the county and is identified as a potential area for recreation and waterfront access in the town's LWRP. This site contains a piped outlet leading from Black Creek to the Niagara River that should be investigated for creation of fish passage to upstream areas. Future trails should give careful consideration to specific low impact design and construction methods which can minimize the impact on environmental resources while providing public access to the waterfront. Specific examples of these methodologies include the use of pervious paving materials, provision of buffering strips along any paved paths or trails to intercept stormwater, reuse of existing roadways and trails to minimize new areas of impervious surface, and use of trail right-of-ways as pollinator pathways highlighting native plant species.

Map 4.22 Town of Wheatfield: Publicly Owned Land Along the Niagara River



A small undeveloped parcel of town-owned land along the waterfront near the Niagara Falls border (Riverside Park) presents an opportunity to enhance a protected natural area that would contribute to the goals outlined in the Greenway Plan that could also be tied into the Greenway Trail. Contamination may need to be addressed at the site before it is suitable for public use; nonetheless, it does present an opportunity to create and expand upon valuable coastal wetland habitat and protect important upland features that are vulnerable to land use changes and excessive dumping that occur at the site. Several conceptual plans have been developed for the site that include a parking lot and trail, which should be adapted through an ecology-based lens to preserve and reduce impacts to important habitat features. An



View from shoreline at Riverside Park along River Road, looking northwest towards the north Grand Island bridge (Town of Wheatfield Greenspace Master Plan, 2014).

11-acre parcel to the east, available for purchase, presents an opportunity to expand upon the park. Funding sources for acquisition along with potential contamination should both be investigated for this parcel.

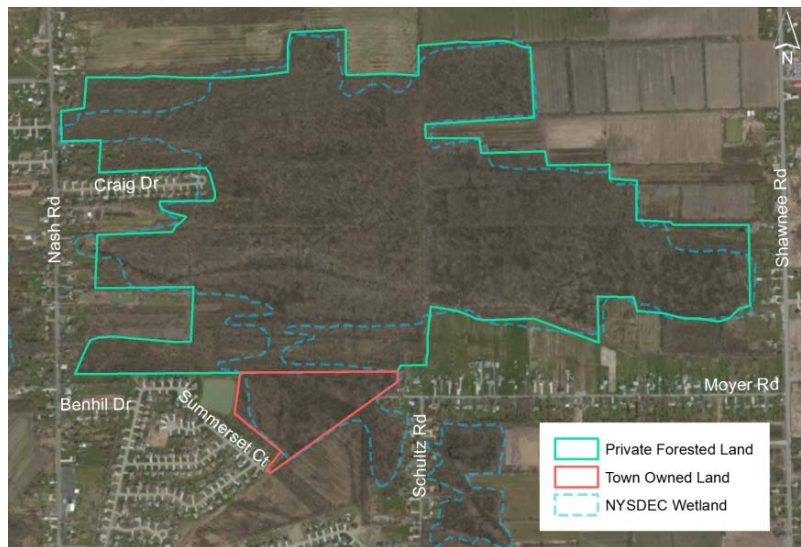
Identify large and/or high quality wetlands for State designation and/or public acquisition.

As mentioned previously, Wheatfield has the largest amount of wetland and natural areas within the Greenway next to Grand Island. Protecting natural areas, especially those that are high quality, contain large acreages, and present the ability to connect other natural areas should be a priority within the town. Two

specific opportunities rise to the top in terms of best bets which include Shawnee Wetland and a large parcel along the waterfront at the southern municipal boundary.

Shawnee Wetland is a large area (approximately 380 acres) of forested wetland that is mostly privately owned with a small amount of town-owned land (referred to as Cherry Hill) at the southern end of the parcel. The area assessed was found to be of high natural resource quality and is remarkably devoid of disturbances like invasive species. Although the area is considered to be semi-protected due to the fact that most of it is classified as a DEC wetland, its quality and vastness warrants a high level of protection from threats that include urban development, encroachment, and land management on privately-owned parcels.

Wheatfield also contains the largest parcels of undeveloped land containing habitat value and a connection to the river within the Greenway. This land is composed of 4 parcels (owned by one entity), totals over 500 acres, and is located between Williams and Winter Roads. The site contains large ponds approximately 40 acres in surface area, several state designated wetlands, extensive areas of hydric soils, and a remnant maple-beech forest that is becoming increasingly rare within the Niagara region. Although ownership is in transition at this point, it is important to note the significance of these parcels and the potential for the protection of the wetland areas located on this land. Any future land uses should strive to preserve the significant ecological assets on the property.



Shawnee Wetland

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Left: Largest undeveloped land within Niagara River Greenway (parcels outlined in blue). Right: One of the ponds located on the property.

Increase habitat values of protected natural areas through improved management practices on public lands.

Oppenheim County Park, the largest within the town, contains 131 acres of protected open space that is primarily used by the public for picnicking and recreation. While much of the park is maintained as mowed lawn, a portion of it has remained in a natural state. Opportunity exists to expand and connect the current areas of natural shrubland in areas that are currently mowed. This would not only provide habitat for grassland bird species that are in decline, but would also provide valuable educational opportunities and reduce maintenance costs at the park. Footpaths could be constructed within the expanded shrubland areas to create greater public awareness of this limited habitat type.



These photos, both taken at Oppenheim County Park show the contrast between mowed lawn and natural habitat at the site. Creating a transition between these areas and reducing the amount of mowed lawn would benefit a variety of species including pollinators and grassland birds.

Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

Compared to surrounding communities, Wheatfield has been experiencing a higher rate of new residential development. When looking at the amount of new housing units between 1990 and 2000, Wheatfield's growth was 31% (1,318 units) compared to Lewiston at 14% and the Town of Tonawanda and Niagara Falls which both had a small decrease. These trends are anticipated to increase as development pressure extends along Niagara Falls Boulevard and spillover from adjacent towns occurs, influencing the need for residential and other development (Town of Wheatfield Comprehensive Plan, 2004). As the demand for development continues to increase, the Town of Wheatfield will need to be deliberate with where new growth occurs in order to preserve the wealth of natural resources and ensure that negative impacts associated with new development like increased flooding are avoided.

Through their Greenspace Plan, Local Waterfront Revitalization Plan, and Comprehensive Plan Wheatfield has done the background work to identify priority objectives and actions needed to guide future growth in a manner that protects important natural resources. Some of these objectives include:

- Ensure all new development includes adequate greenspace and takes drainage into consideration to minimize negative environmental impacts;
- Protect important stream corridor lands, especially Sawyer Creek, as important drainageways and greenspace corridors in the town;
- Prohibit non-greenspace uses from encroaching on creeks, banks, and buffer areas. Possible examples include excessive concrete; scraps such as plastics, paint products, ashes from fire pits, fertilizer, construction site materials; dead animals; and,
- Open space land shall under all circumstances, be protected by a perpetual conservation easement, but may be owned in common by a homeowners' association, offered for dedication to town, city, county or state governments, transferred to a non-profit organization or held in such other form of ownership as the Planning Board finds appropriate to properly manage the open space land and to protect its conservation value.

Wheatfield recently announced that it has adopted a Greenspace Master Plan into code which will help to guide new growth while ensuring that valuable habitat remains intact. The plan depicts areas that are a priority for preservation, which include wetlands, trees, and stream corridors (Figure 4.1). These areas strongly correlate to areas of unprotected natural land that are recommended through the Strategy for preservation (Map 4.23). As stated in the Greenspace Master Plan, applying easements, implementing an Environmental Protection Overlay District, and enforcing setbacks to these lands will ensure preservation. In addition to implementation of these tools, an emphasis should be placed on the following elements when considering future development within the town:

Stormwater:

The town should work to ensure that all new development minimizes negative environmental impacts, including consideration of impervious cover. Wheatfield's current impervious surface percentage at 5.3%, just outside of the range considered to be "very good" (<5%). As impervious cover increases so does runoff, therefore causing negative effects to water quality and overall aquatic health. At a minimum, the town's goal should include no net increase in stormwater quantity and quality as a result of new

development. This goal can be achieved through limitations on impervious cover and requirements for greater on-site stormwater management. Alternatively, adoption of a more aggressive goal to provide an overall reduction in total pollutant loadings post-development could be implemented. Various examples of how this can be accomplished exist within neighboring communities and throughout the state and could be used as reference. Zoning performance standards can help meet these requirements while also allowing for flexibility in how the requirements could be met (i.e. reduced road width, porous pavement, or implementation of green infrastructure, creation of or expanded wetlands).

Subdivision Regulation:

Continuing to engage community stakeholders in land use decisions should also be a priority for Wheatfield. Members of the town have formed a Comprehensive Planning Implementation Task Force, a group of individuals that work towards implementing priority initiatives from the Comprehensive Plan. Currently, this group is looking at enacting a conservation/cluster subdivision law that would provide for more meaningful natural resource protection and function than a cluster subdivision would alone. For example, regulating the design and layout of development envelopes as to not negatively impact stream corridors, riparian buffers, and wetlands has more benefit to preserve habitat function, water quality, and natural stormwater systems than merely setting aside an arbitrary portion of land would alone. Since the proposed conservation/cluster subdivision law is still draft, it is recommended that the final enacted law encompass all sensitive natural resources identified in this plan, as well as the town's Greenspace Master Plan. The proposed law should also be required for subdivisions either town-wide or applied in an overlay to all sensitive natural areas, rather than voluntarily implemented by developers.

Flooding:

Flooding along streams within Wheatfield was noted as a significant problem by town officials, especially along Black and Sawyer Creeks. Mitigation options should be carefully considered when looking at future development opportunities in order to avoid any negative impacts associated with frequent flooding. The Town should also look to revise their Flood Damage Prevention ordinance to incorporate additional provisions beyond the Federal Emergency Management Agency's (FEMA) minimum requirements for the National Flood Insurance Program. More restrictive flood development standards may better preserve floodplain functionality and connectivity, as well as allow residents to purchase flood insurance at reduced rates (FEMA Community Rating System).

Agriculture:

Wheatfield has historically been an agricultural community that has transitioned in the last few decades towards a suburban bedroom community. When farmland becomes vacant or underutilized, many farmers are selling off prime agricultural land to developers because of the residential development pressures that exist in town. However, Wheatfield's Comprehensive Plan and residents acknowledge that the community's appeal is its rural agricultural nature and there is a desire to maintain active farms in town. In 2015, Wheatfield released a draft Agricultural and Farmland Protection Plan. The implementation of the goals outlined in the plan is critical for protecting the rural and agricultural character of the community. Consultation with organizations such as the Western New York Land Conservancy may enable the town to better leverage its resources and goals as well as learn about the processes used within other local municipalities to achieve farmland preservation.

Niagara River Greenway Habitat Conservation Strategy

Map 4.23 Town of Wheatfield: Priority Areas for Protection

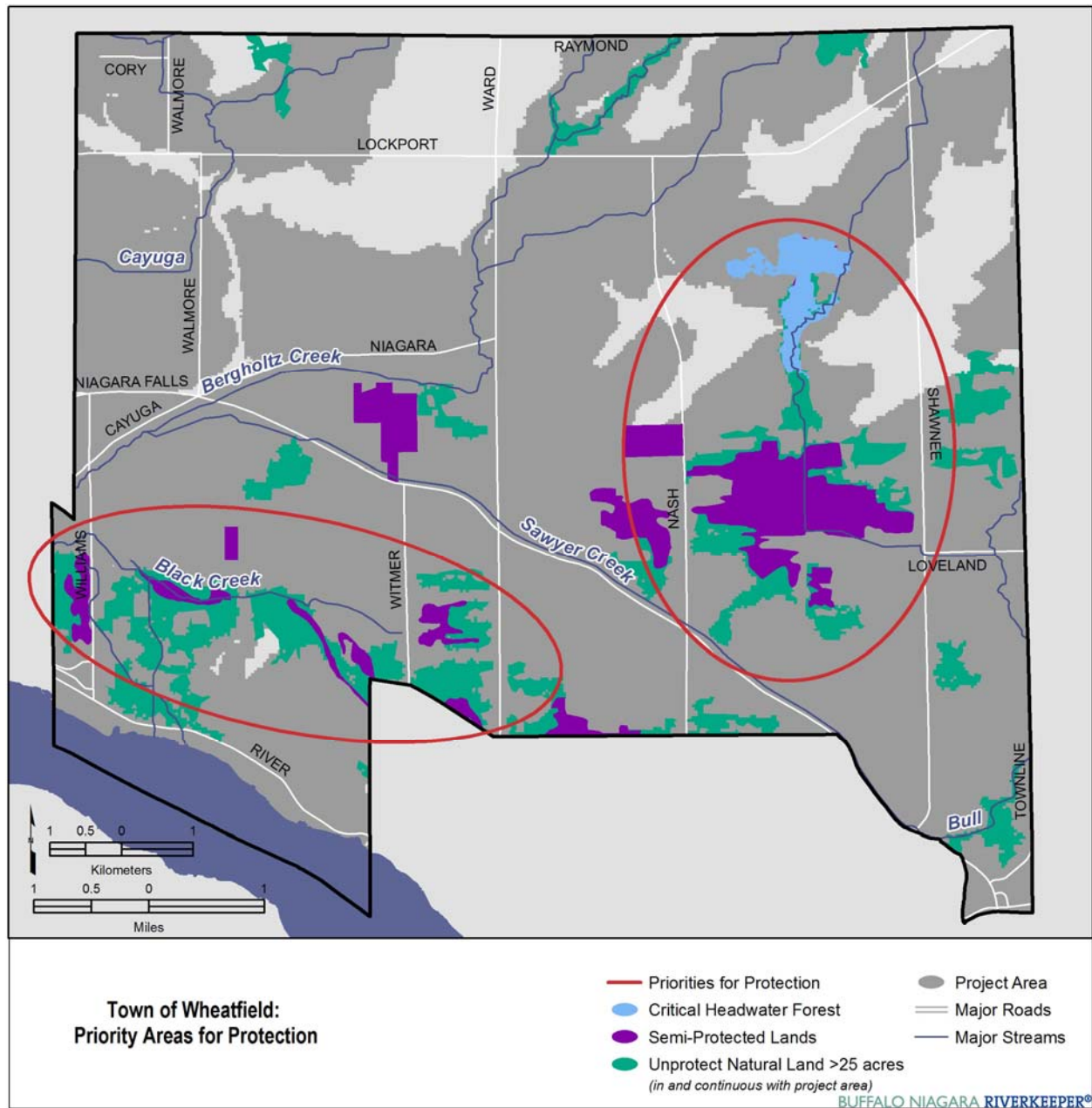
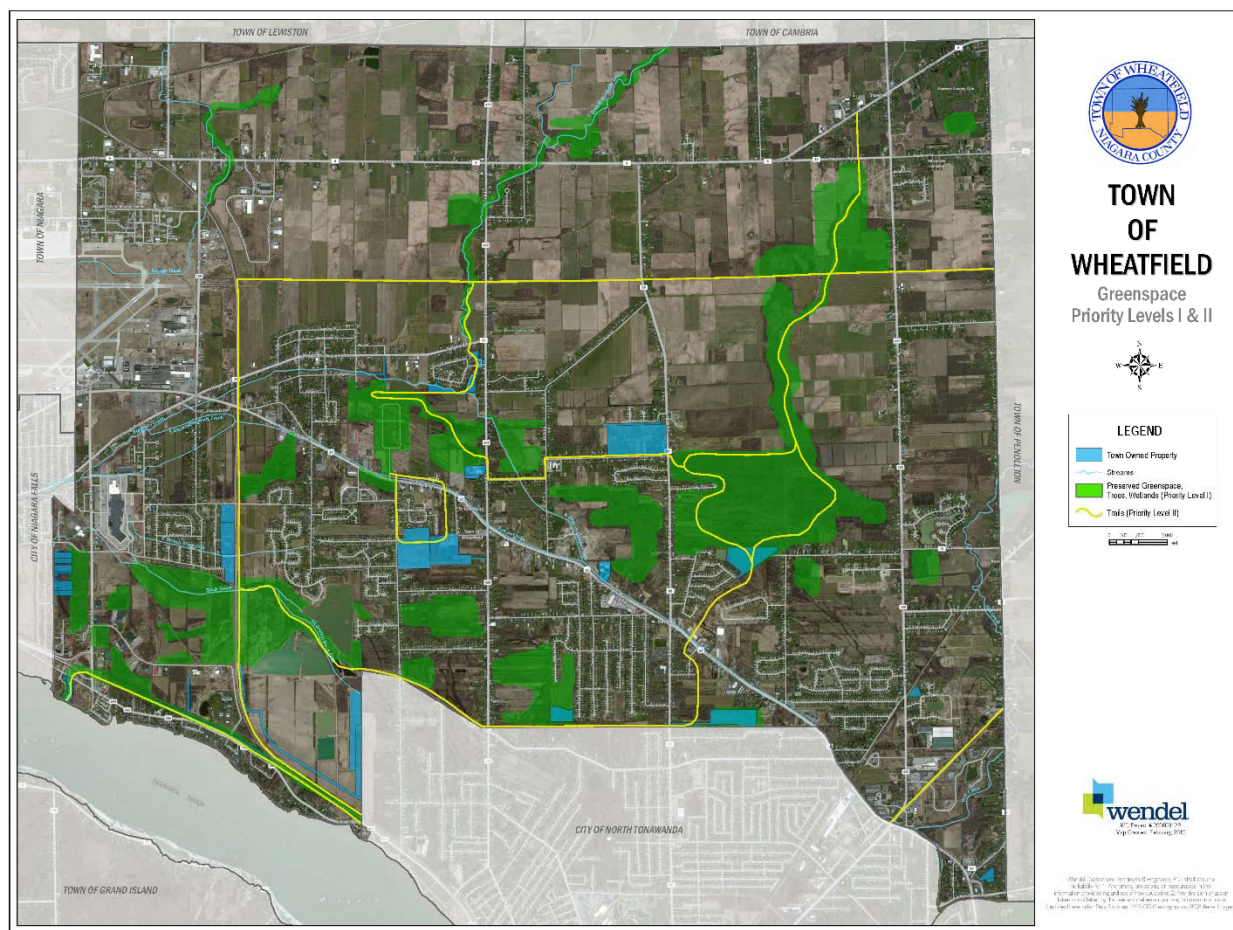


Figure 4.1 Wheatfield's priority areas for protection (Town of Wheatfield Greenspace Master Plan, 2014).



Implement SVAP recommendations.

Overall results from Stream Visual Assessments within Wheatfield showed that stream conditions fell within the “Fair” category, with Cayuga Creek scoring slightly higher than those areas assessed along Bergholtz and Bull Creek due to the presence of instream fish cover, pools, and a high percentage of reaches with good canopy coverage. Riparian zone and habitat conservation to preserve existing instream habitat, including some areas with coarse substrate is recommended for the entire assessed area along Bull and Cayuga Creeks within the town, and Reaches 1-28 along Bergholtz Creek due to the presence of generally natural channels, stable banks with natural vegetation, and high nutrient enrichment scores evidenced by little algal growth (see Map 4.21 for reach locations). Areas assessed along Bergholtz and Cayuga Creeks within the town exhibit coldwater conditions that should be maintained through the conservation of canopy cover and control of runoff from both point and non-point sources.

Education and outreach to waterfront landowners within the town was recommended as a result of the SVAP data collection completed in 2013. Providing information to landowners along waterways was a priority along Bergholtz Creek between Raymond and Ward Roads (Reaches 1-24, and 29-39) and Cayuga Creek between Cory Drive and Walmore Road (Reaches 1-8) with a focus on best management practices in

terms of agricultural practices adjacent to waterways, creating stream crossings that don't interfere with fish passage, and land management strategies along stream sides focused on maintaining buffers along streams to provide stormwater infiltration and flood attenuation rather than mowing to the edge of the stream (refer to Map 4.21 for reach locations; Frothingham, 2014).

Invasive species should be targeted throughout the areas assessed along Bull and Cayuga Creeks. Purple Loosestrife was the main species observed, with Japanese Knotweed (*Polygonum cuspidatum*) and Phragmites also occurring along Cayuga Creek.

Educate landowners about best management practices associated with grasslands, especially on agricultural lands.

The large amount of farmed land within the town also presents an opportunity to educate landowners about best management practices that benefit grassland bird species. Very little of the land cover within the Greenway is made up of grasslands, and most of the areas that do provide habitat for grassland species are agricultural lands. Educating farmers about best management practices like delaying mowing until after nesting season (mid to late August), mowing fields on a rotating schedule so that some usable habitat is available at all times, and flushing birds from the area before mowing occurs is important for providing valuable grassland habitat within the town (NRCS, 1999).

Reduce stream barriers in areas of known or probable interference with aquatic life.

Fish barriers that were identified through the Strategy (12 within the town) are shown in Map 4.21. It is important that the benefit associated with mitigation efforts at each barrier be assessed before any actions are taken. Habitat both below and above the barrier should be taken into consideration along with the amount of stream miles that would be made accessible with barrier removal. The first barriers along Black and Bergholtz Creek and the second barrier on Sawyer Creek should be a priority for investigation as those are the first barriers to migratory fish traveling upstream from the river (the first barrier identified along Sawyer Creek occurs at a drainage ditch where the stream becomes intermittent; therefore, no actions are needed). Barriers to fish along Cayuga Creek exist in downstream areas outside of the town boundary and should be addressed before those located within Wheatfield.

Installation of step pools is recommended for the first barrier on Black (just south of Plaza and Lancelot Drive intersection) and Bergholtz Creeks (near Ward Road) in order to increase water depth and address low flow conditions that are likely restricting passage. The second barrier along Sawyer Creek (near Ward Road) is an area of dense vegetation and sediment just under a culvert with very little water for passage. Vegetation removal, primarily Phragmites, is recommended here to improve hydrologic flow and passage.

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Left: First barrier along Bergholtz Creek. The culvert is in good condition however the site is heavily vegetated with Phragmites. Addressing vegetation and installing step pools will allow passage for minnow and panfish species. Right: Second barrier along Sawyer Creek. Vegetation removal would help achieve passage for minnow species to the upper reaches of the stream.

RIVERSIDE PARK

Municipality: Wheatfield

Acreage: 4.59 acres

Location: River Road

Ownership: Town of Wheatfield

Site Description: Riverside Park is a town-owned parcel that is undeveloped, but it is occasionally used by the public for fishing. The parcel is comprised of mostly palustrine forested wetland with piles of dumped fill material. The Town of Wheatfield has a preliminary plan for parking and a trail at the site to make it accessible to the public and connect it to the Greenway trail; nonetheless, a lack of funding and potential contamination at the site from Love Canal or other nearby industries has prevented this from moving forward.



The site has approximately 200 feet of shoreline along the Niagara River with a well vegetated bank. Most of the land area consists of wetland that has been degraded through placement of fill with some upland areas along the western and northern edges of the parcel. In addition to potential soil contamination from fill materials, invasive plant species are a primary threat to ecological health and account for an estimated 40% of the site's vegetation. Invasive aquatic plant species Phragmites and Purple Loosestrife were observed at the northwest corner of the site and in varying densities across the site. The most heavily impacted area is located east of the fill ridgeline in a graded swale under a power line that runs through the parcel. This area is dominated by Mugwort but also contains a Phragmites patch at the southern end of the swale and an extensive Japanese Knotweed stand that covers a linear elevated berm near the eastern parcel boundary (Map 4.24).

Conservation Strategy: Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Proposed Action/Restoration Potential: The following actions are recommended as priorities for the parcel:

- Address contamination concerns following the recommendations outlined in the Phase 2 report (2013) which may include mitigation measures to address potential for exposure to the fill at the site;
- Enhance shoreline habitat through the addition of fish attraction structures in the nearshore area at intervals. Linear barrier islands could protect the shoreline by dissipating wave energy and depositing sediment to encourage the formation of vegetation beds or emergent habitat parallel to the shoreline. The locations of emergent or submerged habitat enhancements would depend on the siting and design of the barrier islands. This technique was implemented successfully at Little Beaver Island as part of the Niagara River Federal Energy Regulatory Commission Habitat Improvement Projects (Map 4.25);
- Enhance fishing opportunities. This could be completed by installing a fishing platform, or large stepping stones (limestone stackers) placed between the shoreline and barrier islands. Bank

reshaping, grading, or removal of fill material would be required to support shoreline restoration (Map 4.25);

- Link park design with habitat restoration design. A single trail from the proposed parking lot to the shoreline with lateral sections along the river and possible spur trails in the interior of the parcel would correspond well with the size of the site and restoration needs. A single trail could be constructed by grading the existing ridge of fill piles to create an elevated path between the two depressions. Avoidance of trail construction through the wetter habitats would preserve old trees and patches of native vegetation. A modified and less extensive trail route would result in a reduction in impervious surfaces. Additionally, a trail on the elevated fill material not only avoids impacting wetlands further but also provides greater interpretive values by providing enhanced views of the wetlands and other portions of the site. Parking lot size should be reduced from the proposed 42-car paved lot, located at the northeast corner of the property, and the town could use a pervious pavement (Map 4.25);
- Investigate potential funding sources to purchase the 11-acre lot to the east currently for sale in order to expand the park;
- Protect the park area from encroaching land uses to the west. This could occur in the form of strategically planted trees or shrubs, or a fence; and,
- Control and manage invasive species as part of a phased habitat restoration design. Independent of trail construction, invasive plant control and management followed by introduction of native plant communities in all vegetation layers would enhance habitat quality and increase resistance to invasive plant recruitment and regeneration (Map 4.24).

Potential Implementers/Partners: Town of Wheatfield

Potential Funding Sources: Community Foundation of Great Buffalo - Niagara Area Foundation Grants, Brownfield Opportunity Areas Program Grants, NYS Consolidated Funding Applications, NYSDEC Environmental Restoration Grants



Left: Riverside Park shoreline facing south. Right: Western swale of higher quality habitat, looking south toward shoreline. The proposed loop trail follows the depression of the western swale south to the shoreline. The proposed route would require extensive site clearing through this wetland habitat. Avoidance of trail construction through this area of the property would preserve old trees and remnants of native vegetation. The existing depressions could potentially support enhanced wetland plant communities.

Niagara River Greenway Habitat Conservation Strategy

Map 4.24 Riverside Park: Existing Conditions



Data Source: ESRI 2012; Ecology and Environment, Inc. 2014.

Map 4.25 Riverside Park: Opportunities



Note: Additional opportunities include invasive species removal in locations depicted in Map 4.24. The “swale representing the site’s most natural habitat” represents the most important area for conservation.

SHAWNEE WETLAND

Municipality: Wheatfield

Acreage: Approximately 380 acres

Location: Moyer and Shawnee Roads

Ownership: Town of Wheatfield/Privately owned

Site Description: Shawnee Wetland is a large expanse of woodland and forested and emergent wetland that is mostly privately owned. The entirety of the area is classified as DEC wetland (TE-2) with the perimeter containing forested areas at risk for development and 140 acres of critical headwater forest to the north. Only the 30-acre parcel owned by the Town of Wheatfield along the southern portion of the area (Cherry Hill) was assessed, although aerial images suggest that the habitat structure between the town-owned land and privately-owned parcels is similar. The land supports a mature, even-aged upland hardwood forest of high quality that is remarkably devoid of invasive plants, likely due to its isolation from outside disturbances. Immediate threats to the site include suburban development, encroachment, and potential development on privately-owned land which reduce habitat depth, availability, and connectivity.



Conservation Strategy: Identify large and/or high quality wetlands for state designation and/or public acquisition.

Proposed Action/Restoration Potential: The forest and wetland features on the site currently exhibit high ecological integrity and considerable habitat value. Forest protection and conservation is a primary recommendation for the future management of this site. The classification as a DEC wetland offers some regulatory protection for the site that discourages development and encourages maintaining the integrity of the contiguous forest habitat. Yet, the privately-owned parcels are still vulnerable to potential pressures from suburban development that could result in changing land uses in the future. The town should seek to acquire the privately-owned properties either through fee simple acquisition or through use of conservation easements. Using an area like Reinstein Woods Nature Preserve in Depew as a model, Shawnee Wetland could be permanently protected as a preserve and provide formal educational and recreational opportunities. This in turn would increase property values on surrounding lands, as has been experienced in areas like Depew and Clarence where green space has been formally protected.

Invasive species including Common Buckthorn and Purple Loosestrife that were observed along a shallow ditch on the southeast edge of the parcel should be addressed before populations become more established.

Even healthy and high functioning sites, such as Shawnee Wetland, face potential stressors of invasive plants, herbivory by deer, urban encroachment, and additional development which could degrade habitat structure and values. Preservation and conservation of natural resources combined with community stewardship would address existing and future adverse biotic and abiotic impacts. Specific actions that should take place at the site are as follows:

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- Focus on forest edge and the intermittently flowing ditch to the southwest for early detection and removal of invasive species to protect habitat quality. Control current populations of invasive species by hand removal or minimal herbicide treatments (Map 4.27);
- Expand and protect the habitat value of the site through natural resource easements on adjacent and nearby parcels (especially to the north) to add acreage to the contiguous, protected forest and help ensure connectivity to other forested areas beyond Shawnee Wetland (i.e. wildlife corridors);
- Foster stewardship within the town-owned land in order to maintain trails, manage invasives, and provide educational materials. This would increase awareness of the area and help to promote its protection; and,
- Expand areas of wetland to promote connectivity between emergent wetlands within the forest. Additional low-lying depressions would also increase habitat for herpetofauna. Such wetland enhancements should be weighed against any construction impacts given the overall high quality of the forested wetland and upland areas (Map 4.27).

Potential Implementers/Partners: WNYLC, Town of Wheatfield

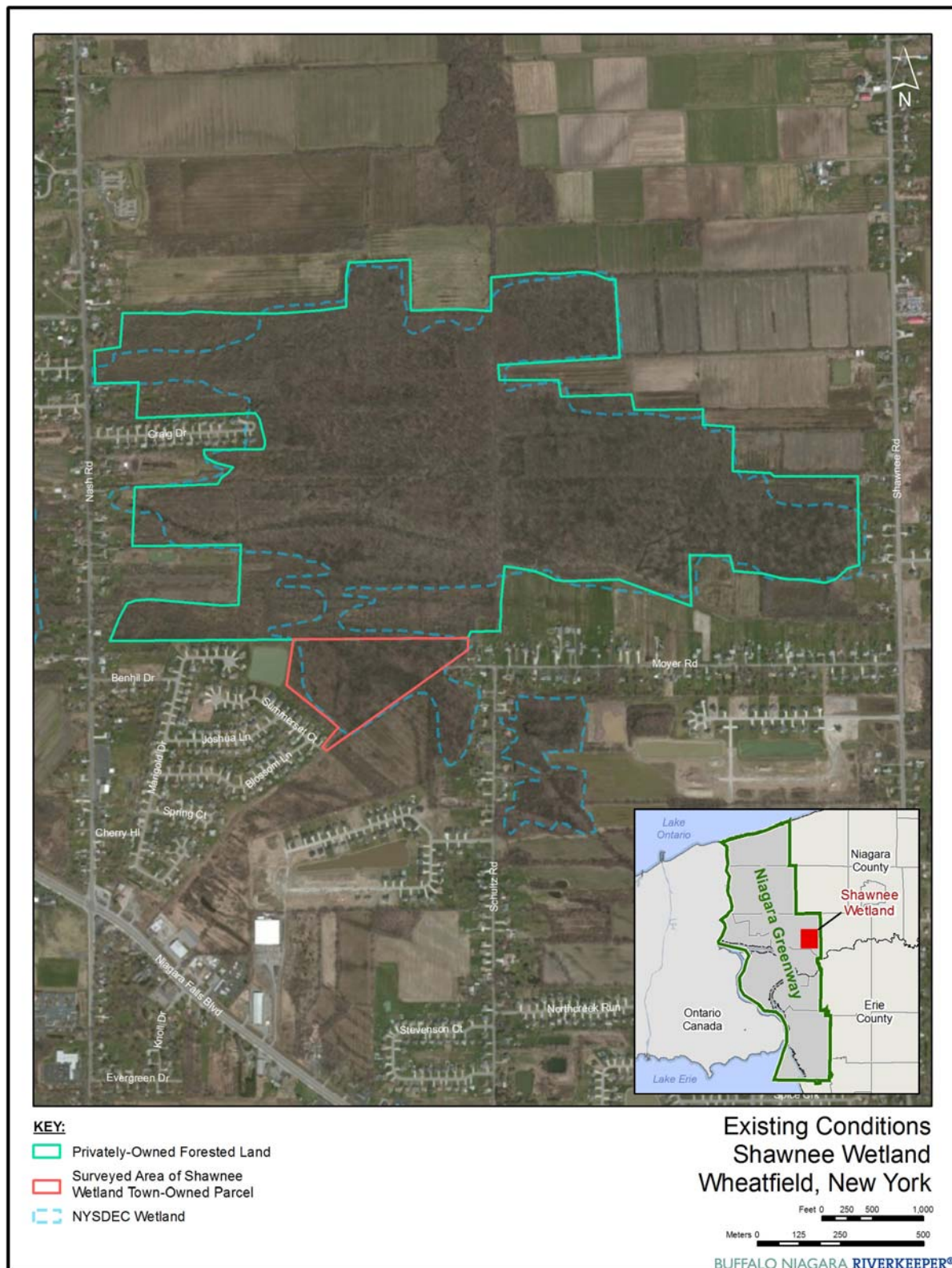
Potential Funding Sources: Five Star Urban Waters Restoration Program, New York State Conservation Partnership Programs, Great Lakes Restoration Initiative - Partners for Fish and Wildlife, Community Forest and Open Space Program, Northeastern Area State and Private Forestry



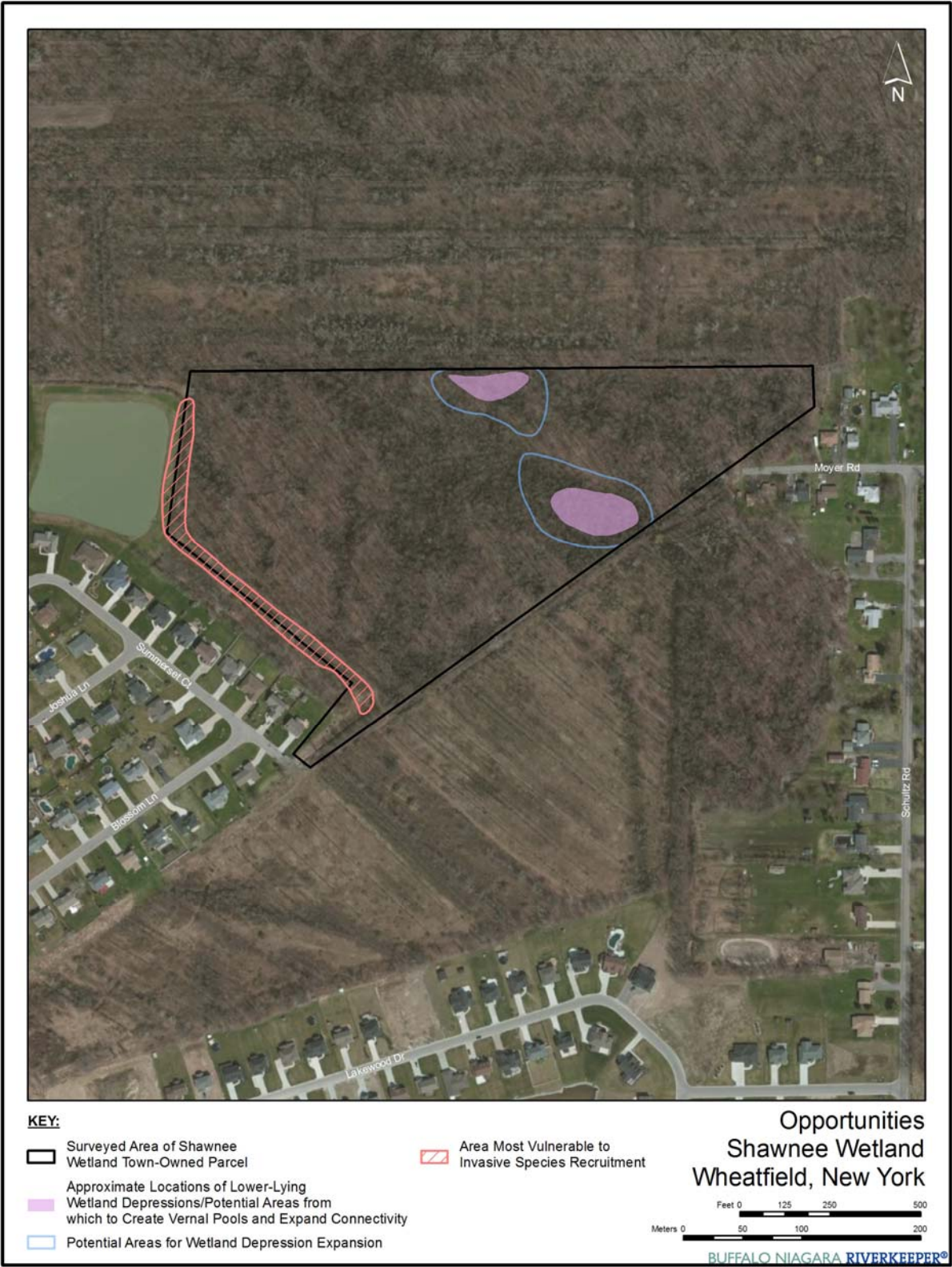
Extensive shrub layer of Spicebush throughout the understory. The Spicebush, oaks, and hickories provide berries and hard masts that are valuable nutrition sources for wildlife.

Niagara River Greenway Habitat Conservation Strategy

Map 4.26 Shawnee Wetland: Existing Conditions



Map 4.27 Shawnee Wetland: Opportunities



OPPENHEIM COUNTY PARK

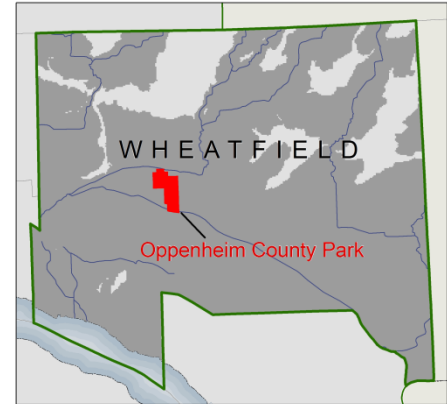
Municipality: Wheatfield

Acreage: 131.6 acres

Location: Niagara Falls Boulevard

Ownership: Niagara County Parks Department

Site Description: Oppenheim County Park is primarily used for public recreation with a number of picnic areas, splash pad, man-made lake, and extensive mowed areas. Sawyer Creek runs along the south end of the park, adjacent to Niagara Falls Boulevard. Grassed depressions throughout the mowed regions of the park capture and convey surface drainage to open ditches that flow into the lake and creek.



Unmanaged areas of natural habitat exist within the northwestern portion of the park boundary that are in various stages of succession. The northern portion of this area is primarily successional shrubland separated by more thickly vegetated hedgerows. Early successional woodland habitat is located in the most northwestern area of the park, which is even-aged forest with a high density of Ash (*Fraxinus* spp.) and Slippery Elm (*Ulmus rubra*) in the canopy along with older Pin Oaks (*Quercus palustris*). The shrub layer is dominated by Gray Dogwood (*Cornus racemosa*). The larger parcel to the immediate south is successional old field with scattered sapling trees and shrubs. Between rows of trees there is a series of subtle, linear east-west depressions that contain some wetland species, primarily Sedges (*Carex* spp.). Regeneration of tree species in the hardwood forested area was observed. Swamp White Oak, Red Oak (*Quercus rubra*), Basswood (*Tilia Americana*), and Red Maple saplings were abundant due to mature mast crop producing trees as well as little to no deer presence. The greatest limitation to habitat quality at the site is the proportion of mowed lawn relative to natural habitat, limiting wildlife use to the shrubland and hedgerows.

Conservation Strategy: Increase habitat values of protected natural areas through improved management practices on public lands.

Proposed Action/Restoration Potential: Suggestions for improving the quality of currently managed areas within the park include the creation of buffers around water features like drainage ditches that run throughout the mowed field and picnic areas. It is possible that the extent of grassed area is more than necessary or desired for public use. Specific needs and recommendations for the park include:

- Create a vegetated riparian buffer for all banks around the lake. A 25-50 foot minimum buffer is recommended to address nutrient and chemical loading. A wider buffer with more roughness in the form of shrubs, native grasses, and wildflowers would discourage geese from gathering and foraging, thereby reducing nutrient loading associated with goose excrement (Map 4.29);
- Design an elevated boardwalk for specific areas along the lake's edge and into the open water to provide public access and replace the need for the existing mowing regime (to the water's edge);

- Implement riparian treatments similar to those described for the lake along Sawyer Creek, at least 25 feet out from the top of the streambank. Planting of emergent vegetation in nearshore areas is also recommended. Potential species include River Bulrush (*Scirpus fluviatilis*), Swamp Loosestrife (*Decodon verticillatus*), and Water-willow (*Justicia Americana*). Planting a buffer would considerably help filter road and surface runoff and reduce nutrient loading (Map 4.29); and,
- Several of the larger grassy ditches that retain water from time to time could be expanded into small wetland habitats with 10-20 foot buffers of emergent wetland vegetation. These would support additional filtering and expand wetland and/or seasonally aquatic habitat for herpetofauna and other wildlife. Trees and/or tree-shrub islands could be planted near the edges of the expanded ditches to increase cover and prevent thermal loading by creating shading over water.

Given the large size of Oppenheim County Park, there are significant opportunities for habitat enhancement. The wooded areas appear to be overall healthy and natural succession will gradually transform the shrubland into forested habitat; however, opportunities exist for habitat enhancement and creation of new habitat in areas currently mowed that would provide additional avian foraging and nesting areas and create habitat for local populations of herpetofauna:

- Efforts to maintain shrubland where it currently exists should be accomplished by targeting tree species for cutting every few years. In areas where hardwood and mast crop producing species are well established, Green Ash and Norway Maple (*Acer platanoides*) could be removed to enhance habitat;
- Additionally, there are many areas within the park where successional shrubland or grassland habitats could be created adjacent to existing forested habitat areas. Converting mowed areas to meadows with warm-season grasses and wildflower species would specifically attract insect pollinators. A priority area for completing this transition occurs in the northwest portion of the park adjacent to areas of already existing natural habitat (Map 4.29). This meadow habitat would increase diversity as an alternative to the Goldenrod-dominated field to the south. A mowing regime of every three years is recommended; and,
- The extent of mowing along the edges of natural features could be reduced to allow for expansion of existing habitats with a transitional fringe. An area of 100-200 feet of mowed lawn adjacent to natural habitat features could be restored to match existing habitats or transformed into demonstration gardens (Map 4.29).

Potential Implementers/Partners: Niagara County Parks Department

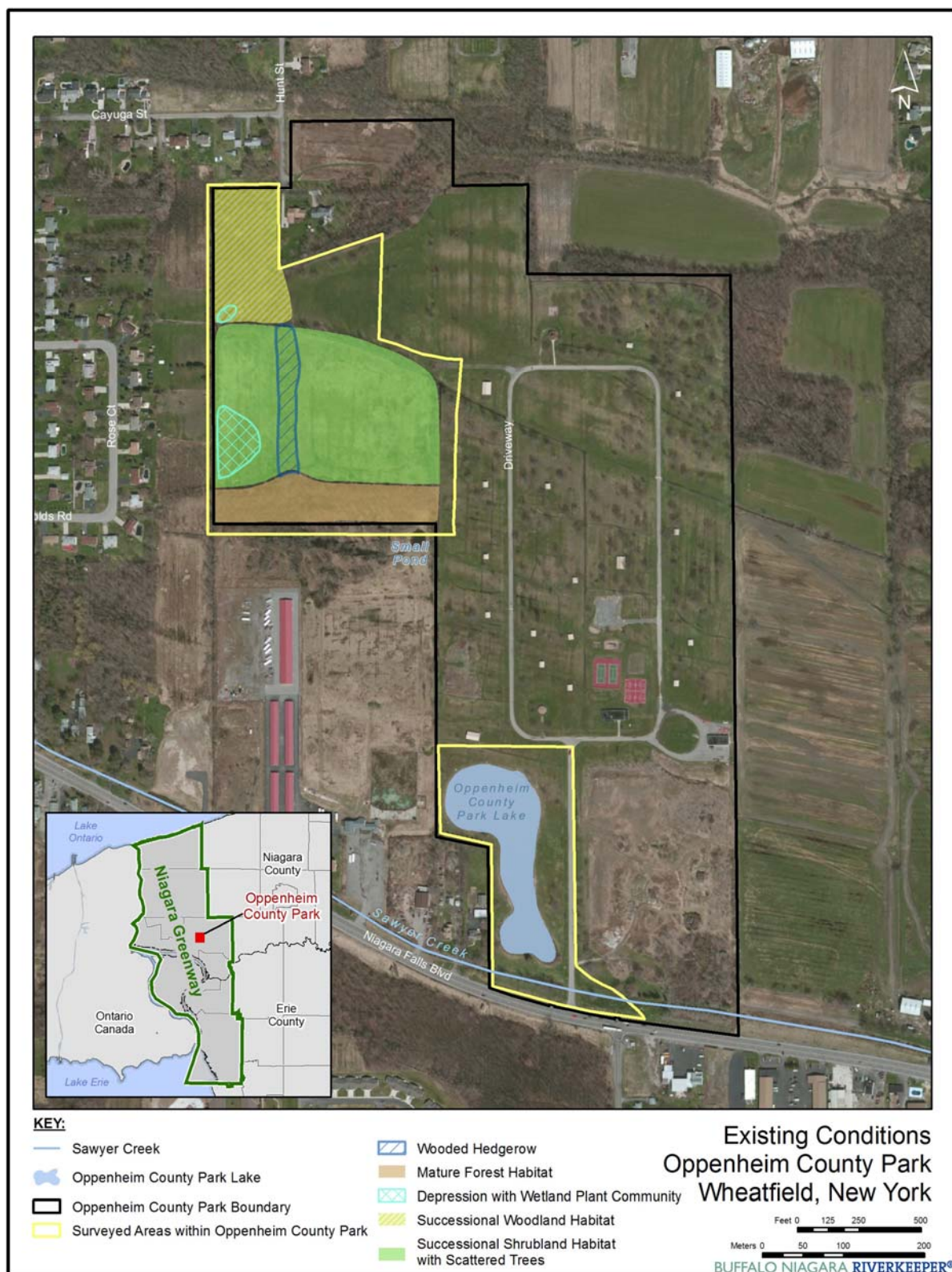
Potential Funding Sources: Urban Waters Restoration Program, Great Lake Basin Program's Soil Erosion and Sediment Control, Greenway Commission Funds

Niagara River Greenway Habitat Conservation Strategy



Left: Sawyer Creek at the south end of Oppenheim Park, parallel to Niagara Falls Boulevard. There is an absence of vegetative buffer to filter surface runoff containing nutrients, sediment, and chemicals from the landscaped and paved surfaces. Right: This is a typical transition between existing natural habitats and mowed lawn at Oppenheim County Park. Establishment of 100-foot to 200-foot native transitional zones could be accomplished by ceasing mowing along the edges.

Map 4.28 Oppenheim County Park: Existing Conditions



Niagara River Greenway Habitat Conservation Strategy

Map 4.29 Oppenheim County Park: Opportunities



Data Source: ESRI 2012; Ecology and Environment, Inc. 2014; USGS 2012.

4.7 City of Buffalo

Existing Conditions:

Buffalo is the second largest city in New York State, and although it is the most urbanized Greenway municipality it still holds significant opportunities for habitat restoration and conservation both within a local context and within the Great Lakes region. The city has experienced a legacy of contamination as the waterfront along both the Niagara and Buffalo Rivers were once home to numerous industrial users including grain milling firms, chemical companies, coke and steelmaking operations, and an oil refinery. Today many of these operations have been abandoned, yet their impacts to the rivers and associated ecosystems can still be seen. Numerous efforts are currently working to address legacy contamination that includes the Buffalo River Remedial Action Plan, Scajaquada Creek Initiative Working Group, and Brownfield Opportunity Area planning. Some former industrial areas have been successfully restored to wildlife preserves like Tifft and Times Beach Nature Preserves. The region's current trend of growth and revitalization makes now an important time to make decisions and thoughtful investments in enhancing, restoring and protecting the city's remaining natural resources. This investment will in turn foster a blue economy, bringing people and businesses back to the water.

The city has the largest overall acreage and project area of all municipalities within the Greenway. It also holds the greatest amount of grasslands (28% of all grasslands within the project area) and brownfields/landfills (343 acres), and the second greatest acreage of Class 1 DEC wetlands (Republic Steel, Tifft, and Times Beach) next to Grand Island (192 acres).

Stream function: The city is located at the point where Lake Erie funnels into the Niagara River and contains important navigational channels and waterfront ports like the Inner and Outer Harbor, City Ship Canal, and Black Rock Canal. Portions of the Buffalo River and Cazenovia Creek are also located within the city, along with Scajaquada Creek which flows into the Black Rock Canal.

Population: 261,310 (2010 census)

Annual Growth Rate: -10.71% (2000-2010)

Existing Institutional Framework:

Comprehensive Plan, 2006

Green Code (Draft), 2014

Zoning Code, currently being updated

Habitat in the City of Buffalo:

Total Municipality: 33,606 acres

Project Area: 13,766 acres (41% of municipality, 16.4% of total project area)

NHD Streams: 22.7 miles

Coastline: 18 miles

Wetlands: 303 acres

Woodlands: 213 acres

Grass/Shrublands: 493 acres

Natural Areas: 1,008 acres

Background:

Numerous ongoing efforts within the City of Buffalo are working towards the purpose of cleaning up and revitalizing areas that have been adversely affected by legacy contamination. Knowledge about these efforts is important in order to obtain a larger picture of what is being accomplished now and over the next several years, and what is needed for long-term actions to protect and restore current and future habitats.

Buffalo River Remedial Action Plan

The portion of the Buffalo River within the City of Buffalo (6.2 miles) was designated as an Area of Concern (AOC) in 1987 due to impairments mainly related to sediment contamination (PCBs, heavy metals, etc.) and habitat loss. The Buffalo River Remedial Action Plan (RAP), which outlines the goals and actions necessary to remediate impairments and achieve delisting, is currently coordinated by Buffalo Niagara Riverkeeper. Between 1989 and the 2000s, the main focus of AOC restoration was on cleaning up inactive hazardous waste sites adjacent to the river. Since 2005, the focus has shifted to remediating contaminated sediments within the riverbed and restoring upland and in-water habitat.

In addressing impairments related to loss of fish and wildlife habitat, the goal of the RAP is to restore 25% of shoreline within the AOC to natural slope, shallows, and aquatic native vegetation (Buffalo Niagara Riverkeeper, 2011). The Buffalo River Habitat Action Plan identifies the potential sites for achieving this goal (Buffalo Niagara Riverkeeper, 2013a).

Brownfield Opportunity Areas

A number of brownfields exist throughout Buffalo that are strategic to the revitalization of the city. The definition of a brownfield is any parcel of land where reuse or development might be complicated due to the presence or potential presence of hazardous wastes or other chemicals, typically as a result of historical use by industrial or commercial operations. Currently, the City of Buffalo is completing Step 2 studies to analyze and propose potential future uses for four specific Brownfield Opportunity Areas (BOAs): the Buffalo Harbor, Buffalo River Corridor, Tonawanda Street Corridor, and South Buffalo (see Figure 4.2). Funds for these plans are provided by NYS Department of State (<http://buffalobrownfieldopportunities.com/>, <http://www.ecidany.com/budc-south-buffalo-boa>).

The goal of the BOA planning process is to develop a vision for redevelopment that incorporates both environmental enhancements and sustainable development. The final plans and future implementation of these plans should or will emphasize habitat and watershed ecology improvements in addition to providing recreational opportunities, preserving aspects of industrial heritage, strengthening neighborhoods, and generating employment opportunities and tax revenues (Brownfield Opportunity Areas Program, 2014).

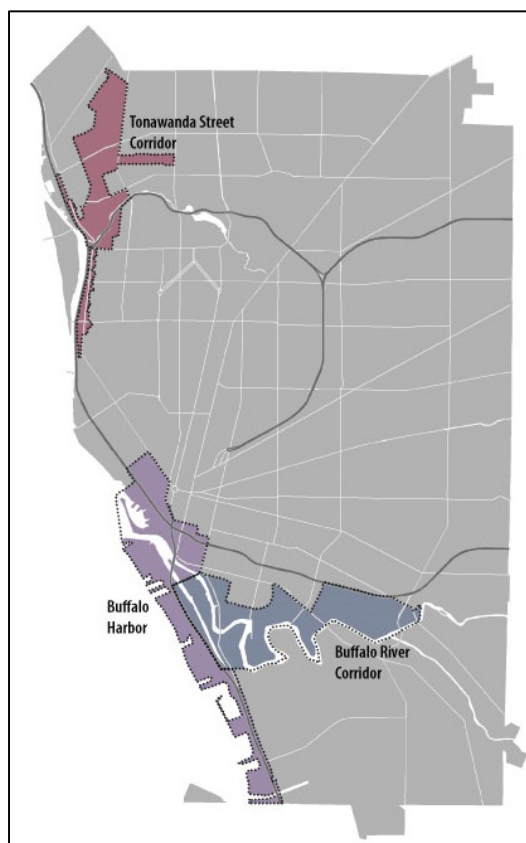
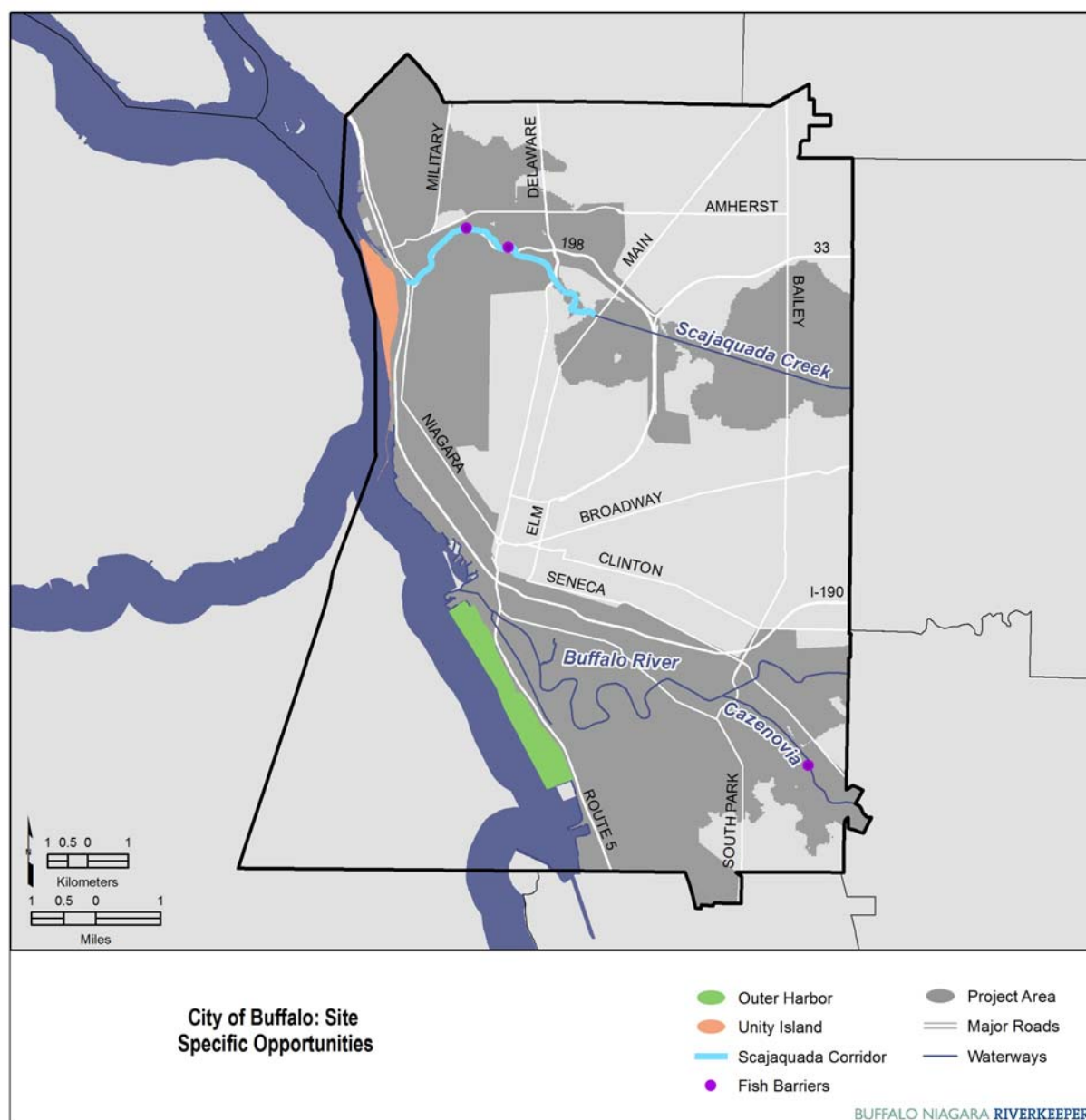


Figure 4.2 Locations of Brownfield Opportunity Areas. Note: South Buffalo BOA not pictured here. (Source: <http://buffalobrownfieldopportunities.com/>)

Map 4.30 City of Buffalo: Site-Specific Opportunities



Recommendations:

In addition to the efforts undertaken by Buffalo River RAP and BOA planning, the work completed through the Scajaquada Creek Initiative Working Group should continue to investigate potential challenges and opportunities in revitalizing the Scajaquada Creek corridor, ideally in a holistic, source-to-mouth approach.

Specific sites along the city's waterfront that hold habitat opportunity include the Outer Harbor and Unity Island. These, along with the overall goals for the Scajaquada Creek corridor are explored more in depth later in this section. Finally, as the City of Buffalo continues to grow and transition from its once

industrial past, it is critical that its regulations and zoning codes contain language that protect important environmental assets that will help establish the region as a model Great Lakes city.

Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Scajaquada Creek

Scajaquada Creek begins in the Town of Lancaster and flows 15 miles west to its outlet in the Black Rock Canal. The creek has endured an extensive history of development, channelization, tunneling underground for several miles, and contaminant inputs from various sources. The mouth of the creek is located in the Tonawanda Street Corridor BOA in an area of significant former industrialization. Numerous studies and efforts have been completed for the creek corridor, and a group of local citizens and organizations (referred to as the Scajaquada Creek Initiative Working Group) have organized to coordinate and work toward an improved future for the creek. Overall, the corridor has the potential to host important fish and wildlife habitat along with public recreation and education features that are significant within its urban setting. It is vital that remediation both in the creek and on lands adjacent to it, including brownfield areas, contribute to improving habitat value.



The Scajaquada Drain in Forest Lawn Cemetery- the point at which Scajaquada sees daylight after traveling underground for 3.7 miles.

Outer Harbor



An aerial view of the Outer Harbor looking south (BNR).

The Outer Harbor is a large expanse of abandoned industrial and landfill sites that currently includes land uses such as abandoned brownfield building sites and pavements, former landfills turned nature preserves, fishing areas, trails and bike paths, and a small new park. Most of the land area is owned by the Erie Canal Harbor Development Corporation (ECHDC) who is actively engaged in developing a plan for future use of the Outer Harbor site. While planning efforts are ongoing, no current timeline is known regarding release of a final plan or timing of plan implementation.

The Outer Harbor's waterfront location is environmentally sensitive due to the facts that that this land forms the floodplain buffer to the city center, is critically located along an internationally significant Important Bird Area, and is surrounded by state designated Significant Coastal Fish and Wildlife Habitats. From an ecological, economic, and social perspective, the Outer Harbor is at the heart of our region's west coast, offering tremendous opportunities

to establish community and coastal resiliency in concert with economic revitalization on a strategically located landscape. The area under consideration is also surrounded by sites that are protected and serve as important migratory stopover sites for birds traveling along the river: Times Beach and Wilkeson Pointe on the west, Tifft Nature Preserve to the southeast just across Fuhrman Boulevard, the Bell Slip in the center, and the Small Boat Harbor to the south which was recently designated as a state park. The habitat within these areas also serves as important spawning areas to species like Muskellunge.

The future of the Outer Harbor is extremely important to the region, not only in terms of habitat, but also to the economy in regards to bringing people to the region and establishing Western New York as Great Lakes destination. The planning of the Outer Harbor must be carefully considered so as to effectively ensure that the integrity of the unique natural area is upheld in a manner that continues to support important habitat for species as well as to encourage birders, anglers, and recreationists to visit and enjoy the region's bounty.

Unity Island

Once referred to as Squaw Island, the recently renamed Unity Island is located between the Niagara River and Black Rock Canal. The northern portion of the island is a City of Buffalo park (currently called Unity Island Park) that is comprised of mowed lawns and fields, a wetland, and several ponds, while the southern portion houses the city's sewage treatment plant with Broderick Park and the Bird Island Pier, both used for public recreation and wildlife viewing, located on the southern tip of the Island. The northern Unity Island Park area holds great potential for habitat enhancement with efforts that would reduce mowing, control invasives, expand wetland habitat, and create connections between the ponds to enhance aquatic habitat. The USACE is currently planning an effort to connect the large wetland pond at the very northern tip of the island to the river in an effort that will reduce depths within the pond and expand wetland habitat with additional planting of emergent and submerged vegetation.



An aerial view of Unity Island
(Source: Google, 2015).

Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

City of Buffalo Green Code

The City of Buffalo recently released a draft Green Code that builds upon their comprehensive plan to guide development over the next 20 years. Included in the Green Code are an updated Unified Development Ordinance, Local Waterfront Revitalization Program plan, Brownfield Opportunity Area plans, and a land use plan. While this effort has not been finalized, it is imperative to ensure that the foundational elements of habitat protection and enhancement are enforced through the code and that code requirements will prioritize ecological assets and prevent future degradation of living infrastructure. The components that present the ability to influence habitat which should be regulated through the Green Code's Unified Development Ordinance include:

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- Prohibiting adverse land uses adjacent to sensitive habitats (such as waterways);
- Expanding development setbacks to a minimum of 100 feet on waterways, wetlands, and other sensitive areas;
- Requiring the establishment or protection of vegetative riparian buffers;
- Dictating BMPs for design of public access into and near sensitive habitat areas to preserve ecological function;
- Limiting the creation of new impervious cover or requiring stormwater to be captured on-site in order to reduce contributions to the city's combined sewer overflow issue;
- Requiring an overall reduction in pollutant load pre and post development each time a parcel is redeveloped along the river;
- Maintaining wildlife corridors and vegetation connections through site plan review; and,
- Sustaining tree canopy and habitat with restrictions on tree removal, vegetation clearing, and native plant landscaping requirements.

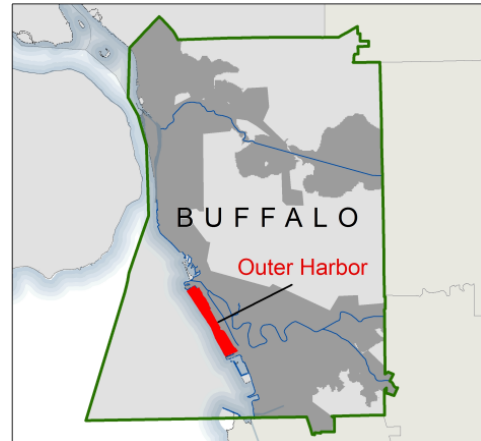
OUTER HARBOR

Municipality: City of Buffalo

Acreage: Total Outer Harbor is 440 acres, however the suggestions in this report focus on the 170 acres at the northern end

Location: South of Buffalo River along Lake Erie waterfront

Ownership: Erie Canal Harbor Development Corporation, NYS Office of Parks, Recreation and Historic Preservation



Site Description: The Outer Harbor was once marshland, dominated by water, vegetation and dunes. The last 150 years drastically altered what we today refer to as the “Outer Harbor,” which was extensively filled to support built landscapes and intensively used for industrial manufacturing and shipping. Today, land use at the Outer Harbor ranges from abandoned industrial brownfields, roadway and bike path infrastructure, maintained landscapes such as Wilkeson Pointe Park, reclamation sites such as the Times Beach Nature Preserve, fishing access areas, and successional fields currently dominated by invasive plants. While remnants of shipping infrastructure still exist, parts of the site are currently used by the public for fishing, walking, and biking. There are known and unknown extents of contaminated soil at the site, and future environmental analysis may impact proposed restoration concepts.

The site represents an opportunity to bring habitat connectivity and coastal resiliency to waterfront revitalization planning efforts. The Outer Harbor is an important access area and shelters spawning grounds associated with Lake Erie fisheries. It is also a critical location within the Niagara River’s globally significant Important Bird Area (IBA) for many at-risk resident and migratory bird (and insect pollinator) species. Enhanced waterfront habitat would benefit wildlife species by connecting the regions of the Times Beach Nature Preserve (at the north end of the Outer Harbor) and Tifft Nature Preserve (2.5 miles south of Times Beach, near the southern end of the Outer Harbor). The field assessment conducted by E & E focused on the coastal region (from shoreline to the Fuhrmann Boulevard bike path) including portions of Wilkeson Pointe Park, a narrow peninsula called the Seaway Pier and the area north of Terminals A and B (Map 4.31).

Noting that there are planning efforts underway for the future of the Outer Harbor, the following recommendations are preliminary, based on current land use. These recommendations may be modified or integrated into future community vision and planning efforts. Current status and conditions of the portions of land that make up the Outer Harbor are explained here from their locations on the north end of the harbor to the south in order to provide a better context for recommended actions.

Times Beach Nature Preserve, once a disposal facility for dredge spoils from the Buffalo River, is now a protected preserve that acts as an important coastal wetland area for migratory birds and pollinator species within the region. Just south is Wilkeson Pointe, an area preserved for public recreational space since 2013 which now features playgrounds, volleyball courts, pedestrian paths, public art, and an area for water taxi docking. Adjacent to the park is a 6-acre grassland site that is potentially slated for future economic development. Also adjacent to the park are two historic boat slips on either side of the area known as the Seaway Pier which is constructed with 8-foot-high vertical concrete seawalls, with the north slip bounded by the shoreline along Times Beach consisting of primarily riprap that is fully exposed

and devoid of vegetation. The adjacent water level is deep but some beds of submerged aquatic vegetation (SAV; primarily Eelgrass- *Vallisneria americana*) are present between the shoreline and the pier. The Seaway Pier peninsula between the two slips is abandoned land that currently supports successional vegetation and is comprised of urban fill, slag, and scattered concrete foundations presenting overall poor soil conditions. A large expanse of upland area is located just south of the Seaway Pier and north of the Bell Slip. This area features a relatively new Greenway Nature Trail constructed immediately along the hardened waterfront and has shoreline conditions similar to Wilkeson Pointe consisting of large rock riprap slope approximately 30-feet in width. The land here also consists of urban fill with non-native soils and landfill piles now forming an undulating topography undergoing successional revegetation. The Bell Slip is the site of a previously constructed restoration project consisting of soil remediation efforts, riparian habitat enhancement, and shallow-water habitat creation. This area has some invasive species and is subject to deposition and scour as a result of a combination of wave action, ice, and seiche events. The Bell Slip is known to support spawning activity for Muskellunge, a dominant Niagara River fish species. The area between the Bell Slip and Terminal A and B (southernmost area assessed during this effort) contains a 1-acre Superfund site in the vicinity of the Radio Tower and consists of contaminated urban land fill. The surrounding landscape is also experiencing successional revegetation including establishment of a Cottonwood forest in the southeast corner. The herbaceous layer is dominated by invasives.

A unique upland area is located approximately 500 feet north of the Bell Slip and immediately east of the Greenway Nature Trail (Map 4.31). This area contains a 5-acre dune-like feature comprised of sand in large mounds and relatively flat sandy areas. The tree layer is sparse consisting of Eastern Cottonwood (*Populus deltoides*) and Boxelder (*Acer negundo*). The shrub layer is dense in areas and is dominated by Sandbar Willow (*Salix exigua*). The herbaceous community is a mixture of typical successional field species with the exception of Spotted Beebalm (*Monarda punctata*), which is a rare native plant in Western New York. This area is evolving and has become an unusual and valuable habitat that should be protected from disturbance and development.

Invasive species are a major stressor throughout the Outer Harbor site; Phragmites and Mugwort have the greatest overall ground coverage. The extent of invasive species is geographically variable (Map 4.31). The area of the Seaway Pier peninsula and east contain 50% Mugwort, 5% Common Buckthorn, and 1% Japanese Knotweed. Invasive species cover 15% of the Greenway Nature Trail section, mostly Phragmites in the north-central region and along the Fuhrmann Road bike path. The area south of Bell Slip has the highest coverage, with Phragmites, Mugwort, Reed Canary Grass, Bush Honeysuckle (*Lonicera* spp.), and Tree of Heaven accounting for more than 60% of the vegetation. Deer and beaver herbivory is another concern for native tree and shrub regeneration; browsing was observed throughout, particularly at the southern end of the Outer Harbor site.

Conservation Strategy: Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Proposed Action/Restoration Potential: Due to the extensive nature of the Outer Harbor and its associated recommendations, proposed actions for aquatic and shoreline resources will be discussed first, followed by those for upland areas.

There are a number of methods that could enhance the shoreline habitat to benefit fish and other aquatic species. The recommended habitat restoration concepts would provide habitat structure and connectivity in specific areas and complement existing public access and use areas.

Removing portions of the seawalls that surround the Seaway Pier (just south of Wilkeson Pointe), bank reshaping/softening, and grading would bring the shore's slope back to the remaining seawall. This would provide a natural shoreline, habitat connectivity between the lake and riparian areas, as well as better access to the water for anglers and wildlife observers. This concept involves removing the top half wall along the western half (towards the lake) along with a portion of the wall on the eastern half (towards land). A gradually sloped shore would create a diversity of aquatic habitats at varying depths. Submerged root wads and rock mounds are proposed to add structure to create fish habitat. Rock mounds could be of various shapes from round to crescent shapes. These mounds could incorporate logs/root wads as part of the structure. It should be noted that detailed engineering studies to determine contamination concerns and to evaluate seiche effects relative to these activities will need to be evaluated prior to implementation. Ongoing decisions regarding the use of this area for ship activity should also be considered before moving forward.

Additional areas where the design and implementation of habitat enhancement concepts may be feasible include:

- Northern Seaway Pier Slip: Reduce water column depths by adding fill to create a diversity of depths from deep to shallow areas and create planting areas for SAV and emergent aquatic vegetation (EAV) in the shallows and rock piles or flats in the deeper areas for fish spawning/structure. This would significantly increase spawning areas for species ranging from panfish to game species (Map 4.32). Cut down and reshape/soften slope along areas of the seawalls as described. The USACE Buffalo District may have ideas and sources relative to the beneficial use of dredged material for this kind of in-water habitat enhancement effort;
- Southern Seaway Pier Slip: If the waterway in the northern slip was converted to shallower areas, this waterway could be left as deeper water habitat with pockets of rock mounds to provide greater structural diversity of habitat and attract game species for fishermen. Cutting down and sloping the seawalls and installing a boat ramp for non-motorized vessels would provide both ecological and recreational benefits (Map 4.32). On the eastern (landward) side creating a gentle slope with flat toe rocks at the water's edge would provide the public with easy access for fishing. If removal of the east wall is not possible, this site could be enhanced with a stairway completely across the access area for fishing. Installation of rock mounds near the stairway structure to attract fish would provide nearshore aquatic habitat;
- Northwest and southwest corners of entrance to Bell Slip: Enhance fish habitat by partially burying the log end of a root wad in the cobble, with the root wad extending into the deeper water. Extend the cobble field into the slip to potentially provide spawning habitat for Lake Sturgeon (Map 4.32);
- South shore/riprap of Bell Slip: Since both shorelines along Bell Slip are accessible along the riprap, place fill in the lower half of the slip's littoral area and plant SAV beds to provide cover and spawning habitat for a variety of fish species including Perch, panfish, and game species (Map 4.32);
- Bell Slip: Place rock mounds in the deeper pockets of the slip for structure to improve fish habitat (Map 4.32); and,

- Terminal (east) end of Bell Slip: Place fine gravel material behind the entire rock toe to provide habitat for turtles, namely Spiny Softshell (*Apalone spinifera*) to use for laying eggs and provide foraging habitat for plovers and other shore birds (Map 4.32).

The upland areas of the Outer Harbor represent an opportunity to create a linear, riparian buffer between Buffalo's commercial and industrial infrastructure and the open waters of Lake Erie. Areas where upland and shoreline habitat enhancements are recommended are:

- Grass area south of Times Beach boundary: Convert area into a warm-season grassland habitat (Map 4.33). This site has the potential to provide habitat connectivity and enhancement to Times Beach Nature Preserve;



Figure 4.3 Detailed upland opportunities on the Seaway Pier.

- Seaway Pier (Figure 4.3): Isolate this site and manage it as a protected and managed upland preservation area with limited recreational access. Create a mixture of grassland and forested pocket habitats with a pedestrian foot path. Create lined vernal pools in the shaded groves that mimic the artificial wetland in the concrete cistern to be used by waterfowl and amphibians. Install an artificial nesting structure in an open area for Osprey. Construct bioswales on the north and south side entrances to the peninsula to further isolate the site from the general public. Options for deer exclusions should also be considered;
- Shoreline along Greenway Nature Trail: Leave existing woody debris and add soil to the upper 10 to 12 feet of riprap. Plant a grass/forb mix and shrub islands of Buttonbush (*Cephalanthus occidentalis*), Sand Cherry (*Prunus pumila*), or Running Serviceberry (*Amelanchier stolonifera*) to vegetate the shoreline. Maintain some type of permanent or seasonal access to the water's edge for anglers. Place rock mounds in the vicinity of the access point to enhance fishing opportunities and create sediment build-up to promote SAV growth;
- Northern end of Greenway Nature Trail (within the Outer Harbor): Using Wilkeson Pointe as a model, create an area with interpretive plantings, such as rain gardens, bioswales, and assorted plantings for butterflies and nectar feeding birds. Modify the mowed grass area to the south into warm-season grassland habitat for various bird species, discouraging geese from the area and reducing maintenance requirements (Map 4.33);
- Dune-like area: Address invasives through spot treatment using hand wipe techniques, spot spraying, hand pulling, and overplanting with native vegetation. Protect area from human and wildlife related disturbances. Installing exclusion fencing would demonstrate dramatic results in plant diversity in the absence of deer overbrowsing (Map 4.33);
- Area northeast of Bell Slip and south of rotary: Create a rain garden or pollinator garden using clean fill (Map 4.33); and,

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- Cottonwood forest at southern end of site: Plant more Cottonwoods and other tree species with denser canopies to create a multi-layered vertical and denser woodland tract to shade out invasive species and provide a stand of concentrated forest habitat for wildlife (Map 4.33).

Invasive species control and management activities across the entire Outer Harbor would be ideal although may be cost-prohibitive. At the least, it would be advisable to employ invasive species control in targeted areas to limit the spread of invasive species and to protect sensitive habitats, such as Bell Slip and the dune-like feature plant community (Map 4.33). Any groundbreaking enhancement activity would likely need to be coupled with overplanting to prevent invasive plant recruitment and regeneration. Areas with Phragmites could be overplanted with harvested Sandbar Willow, Crack Willow (*Salix fragilis*), and Cottonwood to reduce the impact of invasive species. The Seaway Pier and the extent of the waterfront along the Greenway Nature Trail should be a focus for limiting the spread of invasive species.

Potential Implementers/Partners: City of Buffalo, Partnership for the Public Good, Community Foundation of Greater Buffalo, Tifft Nature Preserve, Buffalo Ornithological Society

Potential Funding Sources: Fields Pond Foundation, Sustain Our Great Lakes, FWS Candidate Conservation Action Funds, Joint Venture Habitat Restoration and Protection (Great Lakes Restoration Initiative)



Left: Isolated sod deposit on riprap shoreline along Greenway Nature Trail. This area provides an existing example for naturalizing the shoreline using soil and robust native plants with strong and extensive root systems. Right: Peninsula between the Seaway Piers. This isolated site could be enhanced and managed as a wild area with limited recreational access to increase Lake Erie shoreline habitat values.

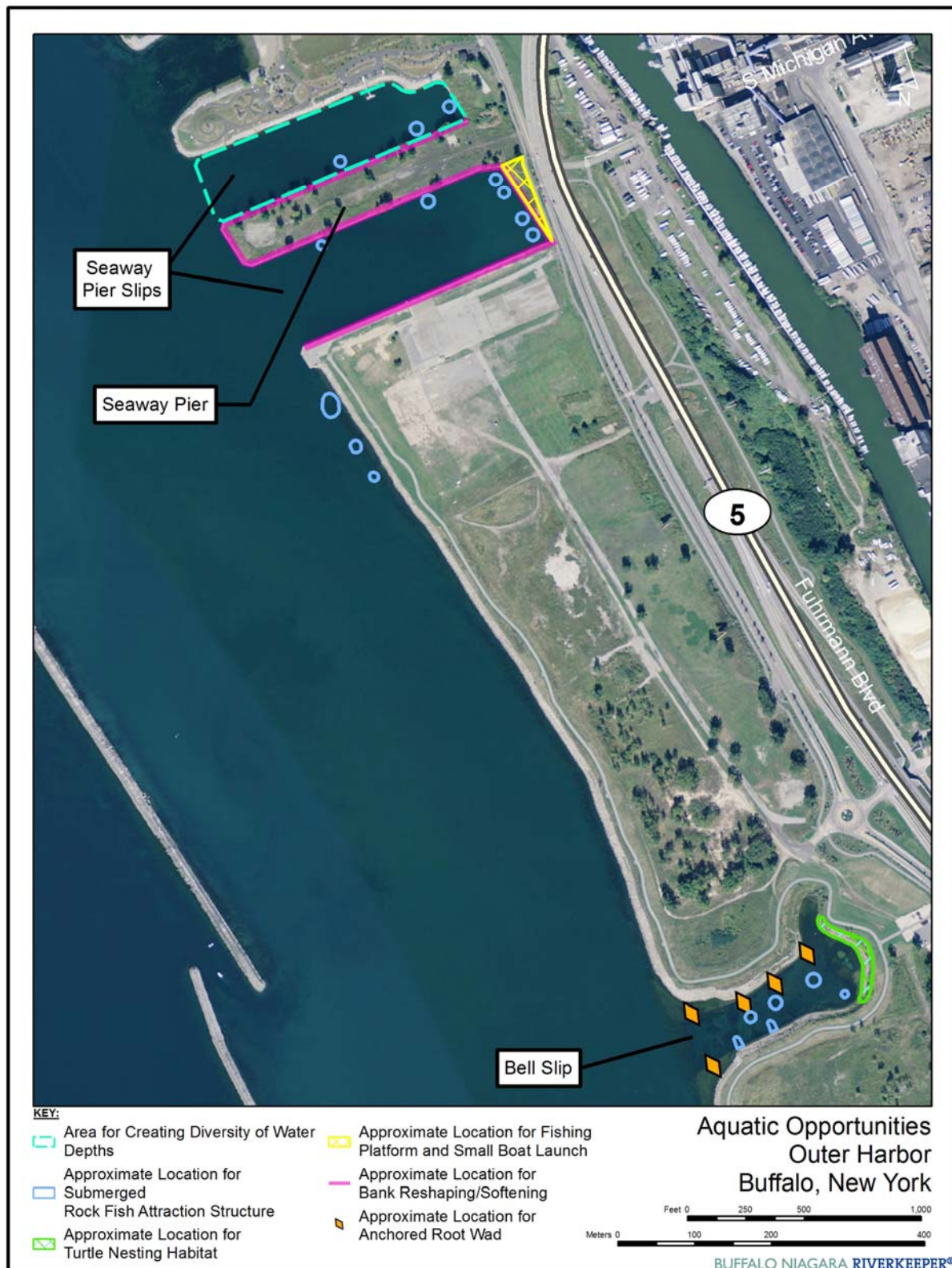
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Map 4.31 Outer Harbor: Existing Conditions

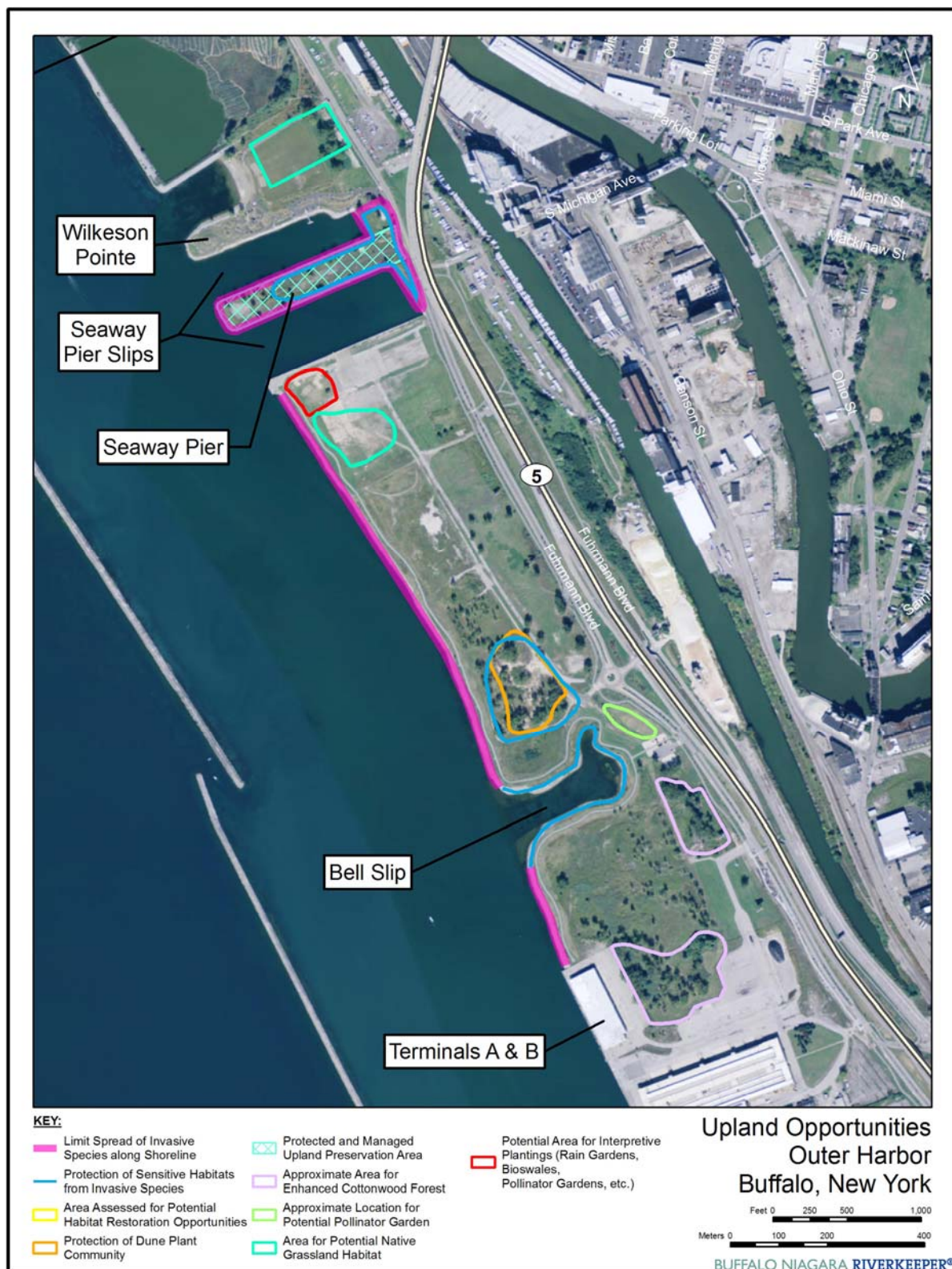


Niagara River Greenway Habitat Conservation Strategy

Map 4.32 Outer Harbor: Opportunities- Aquatic



Map 4.33 Outer Harbor: Opportunities- Upland



Note: Additional opportunities include invasive species removal in locations depicted in Map 4.31.

UNITY ISLAND

Municipality: City of Buffalo

Acreage: Approximately 60 acres (northern portion)

Location: West of Black Rock Canal

Ownership: City of Buffalo

Site Description: The northern half of Unity Island is referred to as Unity Island Park which is part of the City of Buffalo's park system. The park is located on the northern portion of the island and is maintained as mowed lawn and managed landscape. There are three ponds north of the International Railway Bridge in the eastern portion of the park (Map 4.34).

The ponds (north, middle, and south ponds) are connected by a surface water system that is stream-like in some areas and ditched in others. Narrow wetland fringes occur along some portions of the connecting surface water system. A smaller pond south of the International Railway Bridge (west pond) is isolated from the other water bodies.



The USACE Buffalo District is engaged in a planning process under a Section 204 – Beneficial Use of Dredged Sediment for Ecosystem Restoration - project that would connect the north and middle/south ponds on the island to the Niagara River (see Map 4.34 for project area). The USACE project proposes to further enhance hydrologic connectivity of the Unity Island ponds with the Niagara River; the project proposes to mitigate the barrier between the north and middle ponds with a bridge or culvert. “By incorporating hydrologic connectivity under the access road, the project will provide greater benefits to the ecosystem in terms of total area of wetland and aquatic habitat (approximately 5 acres) that will be made available to fish and wildlife species which inhabit the Niagara River, especially species such as Northern Pike that require access to wetland habitat for spawning” (E & E personal communication with USACE Buffalo District, December 5, 2014). Part of the USACE proposed project also includes the creation of emergent and submerged wetlands within the northern portion of the north pond. Additional details and figures concerning the proposed project are available in a detailed project report and environmental assessment (USACE, 2014). Evaluation of the USACE project is out of the scope of the investigations for this project. Therefore this assessment did not focus on the north pond. Nevertheless, the proposal has the potential to significantly improve aquatic habitat, especially the Niagara River fishery.

The park is open from dawn to dusk and is used at low frequency for walking, fishing, and bird watching. Access to and from the park is through a single road that stems from Niagara Street. The access road crosses the Black Rock Canal over a single lane which is adjacent to, and is a shared access with the International Railway Bridge. This road access also provides access to the Erie County Sewage Treatment Plant that occupies the southern portion of the island.

Conservation Strategy: Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Proposed Action/Restoration Potential: Restoration potential within the northern portion of the island focuses on creating grassland habitat in areas that are currently mowed along with aquatic and wetland

habitat enhancement. All proposed actions would build off of future work being completed by USACE at the site.

Modifications to each of the ponds could increase and enhance habitat for fish, waterfowl, turtles, and amphibians:

Middle Pond. The west side of the middle pond at the Black Rock Lock is shallow, emergent wetland habitat that could be expanded up to 50 feet inward (Map 4.35). Areas nearshore could be filled in to create fingers or spits of emergent marsh that extend out from the shoreline into the middle of the pond where the water becomes deeper. The emergent marsh areas could be populated with River Bulrush, Swamp Loosestrife, Water-willow, Buttonbush, and Swamp Rose (*Rosa palustris*). Root wads buried in the deeper regions between the fingers of emergent marsh would be unlikely to shift or be carried away from the site (Map 4.35). Deepening the middle pond along the centerline would create deeper fish habitat. These concepts should be evaluated to align with the USACE Section 204 project which primarily concerns north pond.

North and Middle Ponds. The existing wetland buffer around the north and middle ponds is highly beneficial as a buffer between upland and water, and also provides a narrow area of shallow water habitat for a variety of wildlife and waterfowl. Mechanical and chemical treatments are recommended over three or more growing seasons. The buffer could be enhanced by controlling and managing invasive species. In areas where invasive species are treated, introduction of diverse riparian plants would expand the buffer in both directions.

In places there is an extensive mowed area between the existing buffer edge and the paved path, providing opportunities to widen and diversify the vegetated buffer (Map 4.35). Enhancement and restoration would include replacing the Mugwort with plantings of Buttonbush and Silky Dogwood (*Cornus amomum*) along the banks of both ponds. There is a band of emergent wetland at the southeast end of middle pond which currently provides some ecological values and function. Habitat values could be further enhanced by increasing species diversity of emergent vegetation.

Watercourse/Stream. Additional enhancement could occur along the watercourse/stream that connects the south pond to middle pond. Narrowing the over-widened channel toward the northern and southern extents would enhance the stream corridor between the two ponds (Map 4.35). This recommended action would increase water velocity, increase oxygenation, and lessen sediment deposition in the area between the two walkway crossings. Increased velocity would maintain the channel depth and possibly deepen the channel in those areas which would, in turn, provide for greater diversity in habitat for fish and invertebrates. There is a dam just south of the south walkway crossing between the north and south ponds that could be replaced with a water control structure, allowing for better water level management and control of invasive SAV (Map 4.34). Additional stream data is needed to support in-channel hydraulic modification, impacts on the floodplain, and habitat enhancement design.

South Pond. The primary enhancement need for south pond is invasive species control and management, notably Phragmites in the wetland and Mugwort in the vegetated buffer and adjacent upland area (Map 4.35). Phased approaches to treating these invasive plant species, along with later restoration plantings are recommended. Invasive species are established and without the implementation of control measures have the potential to rapidly encroach into adjacent habitat and

suppress regeneration and growth of native plant communities. In combination with invasive control, the existing un-mowed area, which is a distinct wet meadow habitat on the west side of the pond could be expanded upslope and potentially transition into an enhanced short grass prairie/wet meadow habitat appropriate for this region (Map 4.35). Alternatively, the area could be overplanted with willows and other fast growing trees/shrubs that would provide canopy shade and inhibit invasive species recruitment. Additional habitat complexity could be added to the south pond by placing a number of root wads or log structures along the west side of the pond (Map 4.35).

West Pond. The west pond could be enhanced by deepening the center of the pond to create fish habitat (Map 4.35). Adding soil and planting more vegetation in the riprap would increase habitat value for wildlife and soften the existing armored bank. Invasive species control and management should also be implemented.

The large mowed areas of the park provide ample opportunities to expand natural habitat without infringing on public access and use. Increasing the size of the existing unmaintained buffers adjacent to wetlands and ponds by seeding with native grasses, and planting shrubs and tree islands would create grassland-shrubland habitat (Map 4.34). Another opportunity for habitat enhancement would be to create patches of grassland habitat in the central mowed area of the park, but it may be more desirable (for connectivity and for logistical reasons) to expand upon the existing wetland buffers. Reducing and modifying the mowing regime without active restoration planning and implementation would be insufficient to create high-quality habitat. Un-mowed areas would revert and most likely be dominated by Mugwort. It would be necessary to overplant un-mowed areas with native species, such as warm-season grasses to create short grass prairie or wet meadow. In some areas tree and shrub islands could be interspersed to provide foraging and nesting habitat. The areas in the park currently dominated by Mugwort could similarly be converted to native plant communities that are more beneficial to wildlife species.

Using trees and shrubs to inhibit invasive species is another possible method that could be used in upland areas of the park. Adding conifers, such as Bald Cypress (*Taxodium distichum*) and White Pine (*Pinus strobus*), to the existing stand of conifers west of the east pond would increase woodland habitat for birds and small mammals (Map 4.35). The snags and scattered trees in the park offer suitable habitat for several woodpecker species. Adding grassland habitat in the northern section of the park would provide enhanced foraging habitat for Tree Swallow (*Tachycineta bicolor*) and Eastern Bluebird (*Sialia sialis*).

The area south of the railroad bridge currently provides habitat for small mammal and grassland bird species. Adding grassland habitat to the northern end of the island would augment the existing, managed landfill grassland. The reverting grassland could be potentially enhanced for grassland birds by adding shrub islands or debris piles for structural diversity and refuge. The addition of debris piles or wooden posts would provide perches for hunting raptors and shrikes.

Potential Implementers/Partners: USACE, City of Buffalo

Potential Funding Sources: Freshwater Future Project Grant Program, NFWF Pulling Together, Great Lakes Protection Fund, Joint Venture Habitat Restoration and Protection (Great Lakes Restoration Initiative)

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Left: The dam just south of south walkway crossing. An alternative would be to replace the dam with a water control structure to allow for greater control of water flow and water level adjustments. Right: The west pond near the International Railway Bridge. The pond is characterized by emergent wetland and submerged aquatic vegetation. The area is potentially used by waterfowl, water birds, small mammals, and amphibians.

Niagara River Greenway Habitat Conservation Strategy

Map 4.34 Unity Island: Existing Conditions



Map 4.35 Unity Island: Opportunities



SCAJAQUADA CREEK

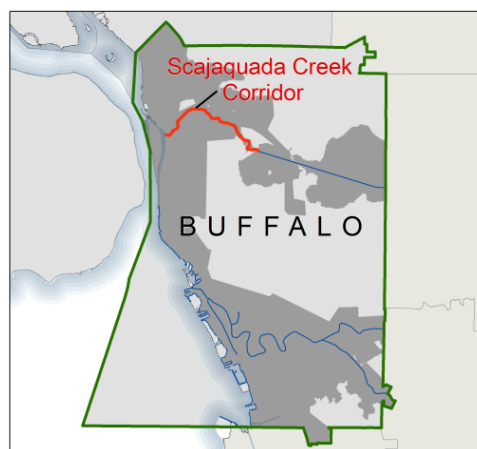
Municipality: City of Buffalo

Length: Approximately 6 miles within City

Location: City of Buffalo

Ownership: Various

Site Description: Scajaquada Creek, whose headwaters are located in the Town of Lancaster, was once part of a rich, diverse wetland complex that is now highly impaired due to channelization, development, urban pollution, and other human related disturbances. A portion of the Scajaquada within the Greenway is buried underground until it daylight in Forest Lawn Cemetery and is then highly manipulated as it flows west, following along Route-198 through Delaware Park and Buffalo State College until its terminus where it meets the Black Rock Canal. In the 1920's, 3.7 miles of the stream were buried underground due to sanitation and flooding concerns. This was the first of many projects that tied Scajaquada Creek to the City of Buffalo's sewer system (Buffalo Niagara Riverkeeper, 2008). The creek is now classified as a Class B stream and was recently designated as a source area of contaminants to the Niagara River AOC.



A number of efforts have been completed, with several ongoing projects, related to the assessment and remediation of Scajaquada Creek. These include:

- Dredging (1990s): The area under the Scajaquada Expressway was dewatered and dredged to remediate sediments due to inputs from the National Fuel Gas property;
- Niagara River Toxics Management Plan Young-of-Year Study (1998): A study completed by DEC assessing the presence of toxic contaminants at levels above thresholds for fish consuming wildlife. The highest level of Polychlorinated biphenyls for all tributaries to the Niagara River came from fish in Scajaquada Creek;
- Scajaquada Creek Watershed Management Plan (2002): Developed by the Erie County Soil and Water Conservation District, this plan detailing management strategies, goals, and action items related to restoration and protection of ecological quality in the watershed is the most extensive planning effort that has been completed for the creek;
- Addressing Shoreline Stability and Hydraulic Impacts on Infrastructure (2014): This document details the results of stream and groundwater studies completed by Buffalo Niagara Riverkeeper and USACE in order to characterize stream function, and hydraulic and hydrologic conditions within Forest Lawn Cemetery as well as suggest preliminary suggestions for restoration work;
- Scajaquada Creek Feasibility Study (2015): USACE is currently completing efforts to collect and analyze sediments from Scajaquada Creek within Forest Lawn Cemetery in order to assess the feasibility of restoration needs. Results of sediment sampling are currently available, and the feasibility study will be released in late 2015 or early 2016; and,
- Niagara River Area of Concern Contaminant Loadings Reassessment Report (2014): In relation to the Niagara River AOC, source areas of contaminants were assessed for their contributions to the river. Surface water was sampled at two points in Scajaquada. Results indicated that although total contaminant loading was relatively low, both sampling locations contained high

amounts of methyl ethyl ketone and acetone with the upstream location having a higher amount of loading. Further sampling is recommended to evaluate spatial and temporal distributions of contaminants and potential sources.

The combined result of these efforts has led to characterization of the major issues that are affecting the health of Scajaquada Creek. Key concerns include sewer overflows, sedimentation and erosion, water quantity and quality, contaminated sediments, and wildlife habitat (Erie County Soil and Water Conservation District, 2002).

Conservation Strategy: Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Proposed Action/Restoration Potential: Several planning efforts have been completed for areas along Scajaquada Creek in addition to those mentioned previously. Priority actions from these documents are detailed in this section. Although the restoration of Scajaquada involves addressing a variety of environmental problems, combined efforts of the watershed community can be leveraged to achieve improved conditions within the creek. A source to mouth, holistic approach needs to be undertaken which contemplates, combines and organizes a sequential approach for working across municipalities to achieve whole system restoration.

Daylighting

One of the main contributors to degradation of the creek is the history of manipulation that has occurred including the tunneling of several miles of stream underground. This is a problem for multiple reasons: natural stream functions are altered, stormwater and other inputs that have been tied into the tunneling system degrade water quality, and the knowledge of, connection to, and economic benefits from proximity to waterfront are lost to the community. Efforts to daylight the Scajaquada are an ongoing topic of discussion, yet implementing this effort proves difficult due to displacement of development in existence as well as cost considerations. A three-year planning effort conducted by SUNY College of Environmental Science and Forestry, in service to Riverkeeper, and in partnership with local organizations and municipalities, proposed a pilot study solution to daylight the creek in Schiller Park which is the largest open space where Scajaquada travels underground.

Stormwater Management

Storm sewers and combined sewer overflows are both contributing factors to the amount of pollutants found in Scajaquada Creek. Combined sewer overflows (CSOs) occur most often in older cities where sanitary (sewage) and storm sewer systems that carry water to sewage plants are combined. When heavy rains occur and capacity of the pipes or treatment facility is exceeded, the system is designed to outflow or overflow excess combined effluent directly into the waterways. (Erie County Soil and Water Conservation District, 2002). In compliance with mandates from the USEPA, the Buffalo Sewer Authority has committed to investing \$380 million over the next 20 years to reduce the amount of sewage and stormwater overflows for all of Buffalo's sub sewersheds. This includes research and implementation of green stormwater infrastructure techniques which detain, capture and infiltrate stormwater before it enters the combined storm sewer system.

Additional techniques that should be a priority for future efforts and decisions related to stormwater issues along the creek corridor include: establishing riparian buffers, implementing erosion and

sedimentation ordinances (to set a limit on soil disturbances at construction sites) to limit pollutant and sediment inputs and filter them before entering the stream, limiting development and impervious surfaces like parking lots from being placed along the stream corridor, and applying green stormwater infrastructure techniques like installation of pervious pavement, downspout disconnections, and storm water retention systems where appropriate to decrease flooding during peak flows (Erie County Soil and Water Conservation District, 2002).

Water Quality Improvements

In addition to sewer and stormwater inputs, other cited sources of pollutants to Scajaquada are contaminated sediments, streambank erosion, hydromodification, construction, land disposal, and chemical leaks and spills (Erie County Soil and Water Conservation District, 2002). The best remediation techniques for sediments in Forest Lawn Cemetery will be identified in the results of the Feasibility Study currently being completed by USACE. Reshaping and replanting failing streambanks is the most cost effective method for reducing the amount of sediment, erosion, and deposition and improving overall water quality. Enforcing regulations for other inputs from industries, construction activities, and other activities (i.e. fertilizer application) is another important action needed to reduce future pollution within the Creek (Erie County Soil and Water Conservation District, 2002).

Wildlife Habitat Improvements

Riparian Habitat

Improving habitat for wildlife is an important objective for Scajaquada not only because it is located along an internationally significant Important Bird Area, but also because the narrow strip of vegetation along the creek is one of the few areas of natural habitat within a largely urban area. As mentioned previously, riparian buffer restoration is an important objective for filtering pollutants and reducing sedimentation within the creek. Buffers also provide important habitat for both aquatic and terrestrial species. Ensuring the presence of valuable riparian buffers wherever possible is a priority objective for restoration of the creek, including the removal of invasives within riparian corridors.



Finger dam that impedes fish passage to upstream areas of Scajaquada Creek.

Aquatic Habitat



A channelized section of the creek within Forest Lawn Cemetery. The stream has narrowed naturally within the artificial walls.

Aquatic habitat restoration is another important objective along the creek; however, these actions should be addressed once needs associated with the remediation of contaminated sediments are determined so that they are not affected by any future dredging activities. Addressing barriers and improving in-stream habitat are the two priority actions under this objective.

The first impediment to species traveling upstream along Scajaquada is a finger dam located east of Grant Street. The dam prevents passage for fish and also makes recreational activities along the stream difficult. More investigation into flow alterations that would result from dam removal should occur before any action is taken. A potential solution could be the installation of a fish ladder to allow for fish passage to upper reaches of the stream which would in turn increase genetic diversity and population growth of fish species due to the increase in availability of spawning and nursery habitat. A second impediment to aquatic species and natural flow is the trash rack located in Delaware Park where Scajaquada is diverted around Hoyt Lake. Reconnection of the land and creek in order to restore habitat viability and reduce stagnation also needs to be investigated.

In-stream habitat is another factor that should be addressed along the stream corridor. After years of manipulation, the creek is highly channelized and does not contain natural in-stream features that are important in supporting aquatic life. Addressing this problem could include installing boulder clusters, large woody debris, bank cribs, and tree cover. Improvements to channelized banks should also be addressed. Areas within Forest Lawn Cemetery are highly channelized and offer little to no elements of natural streams that are needed to support wildlife like shelter, overhanging vegetation to cool water temperatures, or areas to hide, spawn, and rest. Although removal of the stone walls along the channel can be costly, incorporating these features within the stream channel can be done without removal of artificial walls. Alternatively, specific locations for wall removal and replacement with living shoreline applications have been identified as one potential restoration opportunity. Allowing the stream channel to narrow and/or meander will also improve water quality, allow for passage of more fish species, and provide important habitat elements for the viability of aquatic and terrestrial species.

Preserving Green Space

Preserving and enhancing existing green space is another priority objective identified for Scajaquada. Two specific opportunities include the restoration of a historic wetland within Forest Lawn Cemetery and the improvement of abandoned brownfield lots near the mouth of the creek.

Swan Lake is a historic wetland located adjacent to the creek near Delaware Avenue (Map 4.36). The wetland was filled and is now a large area of mowed lawn. This site presents an opportunity for installation of an experiential wetland that would connect the creek to its original floodplain. The created wetland will reduce flooding, provide sediment storage, filter pollutants, and provide a unique education experience within an urban area (Buffalo Niagara Riverkeeper, 2014b).

Several abandoned parcels closer to the mouth of the creek also have potential to be transformed into areas of valuable habitat that are significant within the context of the creek corridor and will contribute to the creation of a Greenway along the water's edge. Several scenarios are proposed in the Tonawanda Street Corridor Brownfield Opportunity Area Nomination Document (Brownfield Opportunity Areas Program, 2014). These areas should remain undeveloped and provide both public access and wildlife habitat. Vacant and abandoned parcels along the creek corridor that should be considered for these opportunities are shown in Map 4.36.

Public Awareness and Participation

Involving the public in the future improvements for Scajaquada is extremely important to effectively implement priority actions. In this case, it is even more important due to the fact that so many city residents are disconnected from the creek itself. Educating and increasing public awareness about the current problems associated with the creek and the actions they can take to make improvements is an

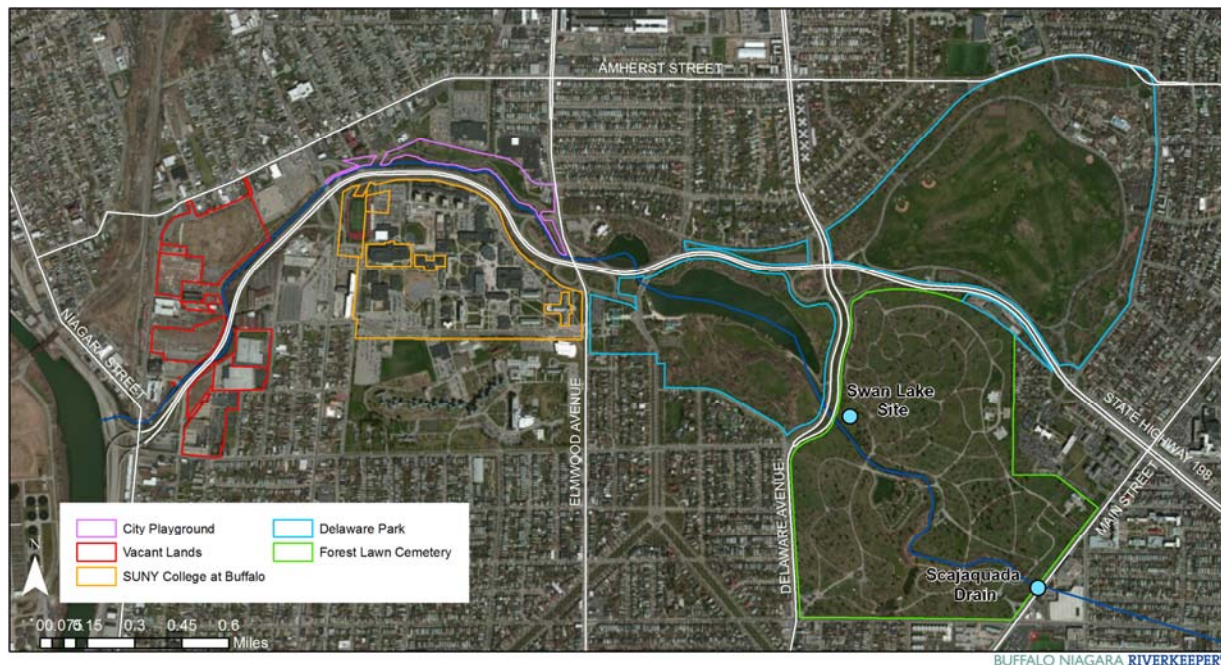
Niagara River Greenway Habitat Conservation Strategy

important step in achieving improvements to the creek. Making the creek more accessible and improving recreational and educational opportunities is another important action. Projects such as daylighting of the creek through the East Side, wetland creation at Swan Lake, or removal of the finger dam will allow citizens to better connect with and learn about the current state of the creek. Riverkeeper, in collaboration with the Buffalo Niagara River Land Trust, recently acquired a parcel near the mouth of Scajaquada that will be converted into a paddle sport launch after remedial work is completed. Actions such as these are important to promote community ownership of the opportunities and to leverage public support for implementation.

Potential Implementers/Partners: Scajaquada Creek Initiative Working Group, City of Buffalo, USACE, Forest Lawn Cemetery

Potential Funding Sources: Greenway Funds, Great Lakes Restoration Initiative

Map 4.36 Generalized Land Uses along the Scajaquada Creek Corridor



4.8 Town of Grand Island

Existing Conditions:

In the context of the Greenway, Grand Island is an urban oasis. The town contains the largest amount of mapped wetlands, woodlands, and natural areas within the Greenway project area (46%, 44%, and 43% respectively) as well as the highest acreage of sensitive and headwater forests of all Greenway municipalities. The island is largely flat and contains mostly forested wetland habitat due to wet soil conditions and a high water table in some areas. Located within an Important Bird Area and surrounded by state designated Significant Coastal Fish and Wildlife Habitat, the island exhibits habitat conditions that are unique and noteworthy within the region. The town also serves as the main route of travel between the cities of Buffalo and Niagara Falls. As a bedroom community between the two cities, Grand Island is one of the towns in the region that is experiencing population growth and whose primary land use consists of suburban residential development (Buffalo Niagara Riverkeeper, 2014a). Municipal officials are aware of the important habitat located on the island and are taking actions to maintain its ecological integrity and the natural public assets that it offers. Supporting the town in these efforts might be the lowest hanging fruit of all opportunities identified within the Strategy. Support includes partnering to implement ecologically-based Greenway projects, endorsement of municipally-sponsored ecological projects, and provision of adequate funding to foster future collaborations and ensure implementation of projects that return a high ecological value to the region.

Stream function: The main tributaries on Grand Island include Big Sixmile, Little Sixmile, Spicer, Gun, Woods, and Burnt Ship Creeks. Most of these are 1st order, headwater streams and serve as important spawning and nursery habitat for native migratory fish.

Population: 20,374 (2010 census)

Annual Growth Rate: 9.41% (2000-2010)

Existing Institutional Framework:

Local Waterfront Revitalization Plan, 2006

Zoning Code, 2004

Comprehensive Plan, 1995

Design & Performance Standards, 2007

Habitat in Grand Island:

Total Municipality: 21,304 acres

Project Area: 16,040 acres (75% of municipality, 19% of total project area)

NHD Streams: 56 miles

Coastline: 27.5 miles

Wetlands: 6,687 acres

Woodlands: 3,010 acres

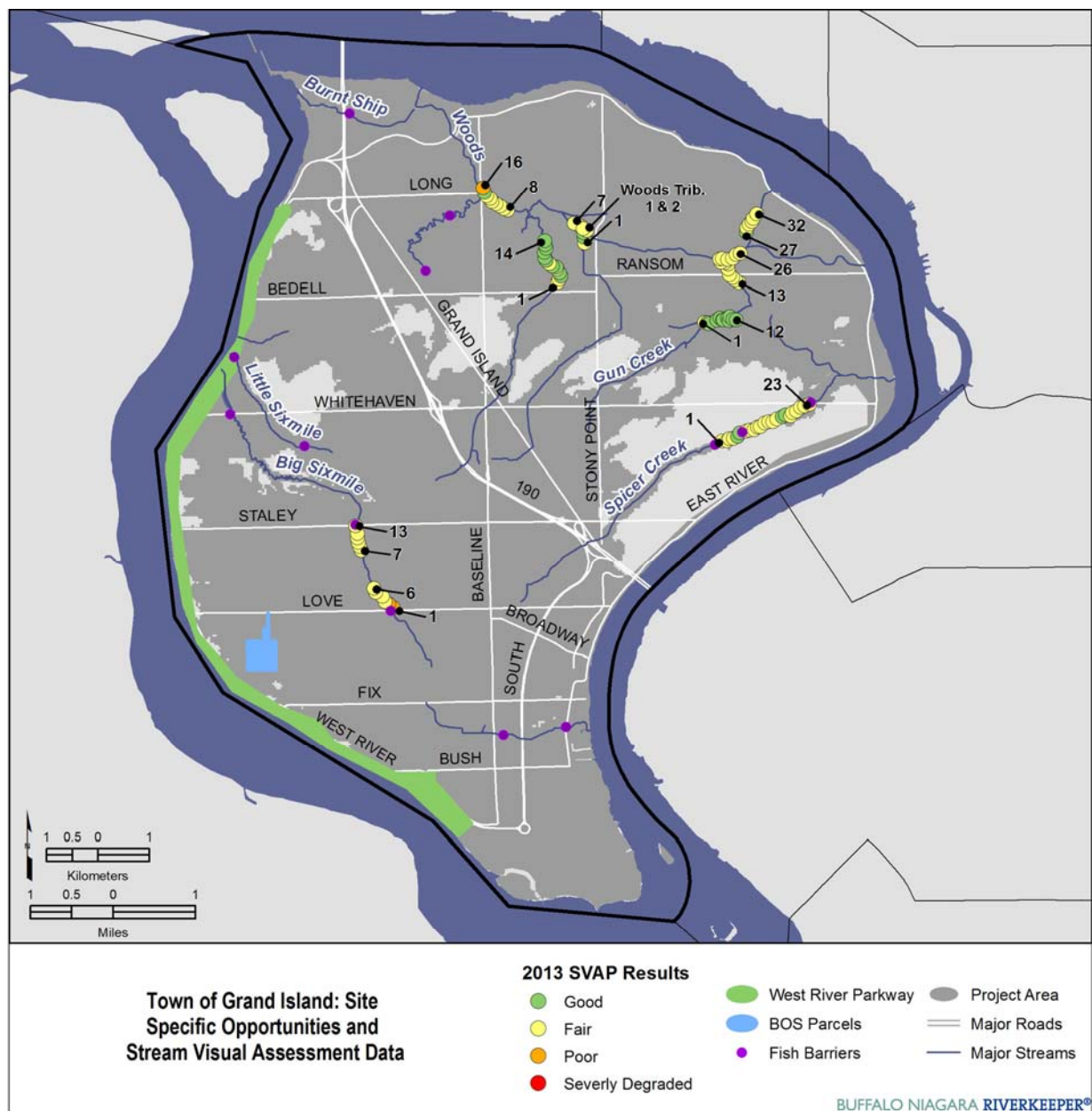
Grass/Shrublands: 208 acres

Natural Areas: 9,904 acres

Recommendations:

Priorities within the town focus on protecting large areas of unprotected habitat significant within the region, improving water quality and riparian buffers along streams and coastal areas, and addressing barriers to fish along tributaries. The following strategies and opportunities are recommended for the focus of future natural resource management for Grand Island. Site-specific opportunities mentioned here are detailed more fully later in the section.

Map 4.37 Town of Grand Island: Site-Specific Opportunities and Stream Visual Assessment Data



Note: SVAP data displayed includes reach numbers at the beginning and end of each segment assessed. The main branch along with two tributaries of Woods Creek were included in the assessment. The first tributary contained 7 reaches while the second had 2 reaches. These are located just west of Stony Point Road. Detailed opportunities for all assessed areas are found in the recommendations section.

Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

West River Parkway

The coastal zone along the entire western portion of the island is owned by the New York State OPRHP. This land presents a great opportunity to improve habitat and coastal resiliency while addressing erosion problems and creating connectivity to coastal wetlands. Several areas along this stretch of land were assessed in depth, and priority areas for completing habitat restoration were identified. Best management practices for this area include increasing the amount of vegetation and expanding the riparian area, implementing living shoreline treatments, removing invasives, and educating landowners in the area about the importance and value associated with intact riparian and coastal habitats. Land management on this portion of the island should be carefully considered including mowing regimes, dock installation, or any activities that would compromise the integrity of shoreline habitat.



An example of the erosion occurring along Grand Island's western coast.

Connecting the upland habitat along shoreline to existing in-water habitat or expanding on aquatic habitat where possible would also be beneficial in providing important areas for fish reproduction and waterfowl foraging. Grand Island's eastern shore is cited to have the most extensive aquatic beds in the upper river, nevertheless there is opportunity to enhance and expand this habitat along the western coast (Buffalo Niagara Riverkeeper, 2008). This in turn would contribute to the improvement in fish and wildlife habitat that has largely been lost within the region, a goal identified in the Niagara River Remedial Action Plan.

Tributary Habitat

Portions of the tributaries within Grand Island have been designated as NYS DOS Significant Coastal Fish and Wildlife Habitat due to the fact that they are some of the least developed in the region and provide important spawning and nursery habitat for warmwater fish species. However, recent data indicates that water quality along these streams is somewhat degraded. In 2010, data collected from the Niagara River/Lake Erie Basin Waterbody Inventory and Priority Waterbodies List classified the habitat and hydrology for all Grand Island tributaries as "threatened" and aquatic life as "stressed". The threat to aquatic life and habitat was suspected to be caused by, "elevated stream temperatures, silt/sediment and other nonpoint inputs related to suburban/urban



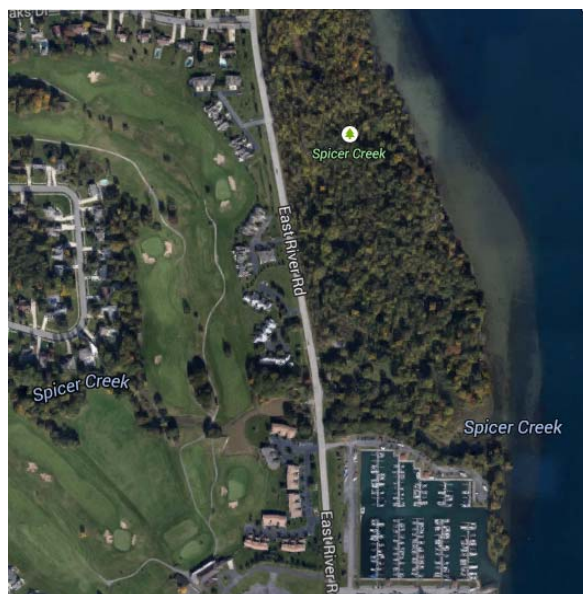
This reach along Woods Creek would benefit from landowner education to address mowing to stream edge.

development in surrounding primarily residential areas” (DEC, 2010). Practices such as lawns mowed down to stream banks, use of residential and golf course fertilizers, stream channel disturbance associated with the creation of new roadways, and culvert installation have all seemingly contributed to increased sedimentation and altered hydrologic conditions within the main tributary channels and ultimately, into the Niagara River.

Identifying areas on Grand Island to enhance buffers is an important and inexpensive action needed to improve the water quality of these streams.

Through the SVAP assessment, several areas were identified as priorities for increasing stream buffers. The upstream portion of Woods Creek would benefit from an increase in the width of the riparian zone (Reaches 9-11, Map 4.37). Environmental education and outreach to address riparian zone and bank stability issues (e.g., mowing to streamsides in residential areas, recreational activities, and limited litter issues) should be completed for the entire assessed portions of Gun, Big Sixmile, and Spicer Creeks (Frothingham, 2014).

Erosion and sedimentation from Spicer Creek was identified as a major problem through the SVAP and fish barrier investigations. The creek is relatively slow and meandering, draining agricultural and residential land in addition to a golf course close to its confluence with the Niagara River. During rainfall events, runoff from these areas results in a high bedload being carried to the river. As this bedload enters the Niagara River it encounters a shallow zone causing a marked decrease in flow velocities, therefore impacting the ability of the creek to carry bedload further into the river proper. This means that the bedload is largely being deposited as opposed to being processed by the river. Ultimately this results in a reduction in aquatic vegetation where the increased sedimentation occurs. Several methods for addressing this problem have been proposed including: increasing riparian habitat in areas where it is lacking (especially along the golf course and in developed areas), narrowing the creek channel on state-owned lands from East River Road to the mouth to increase velocities during storm events, and creation of a channel from the mouth of the creek further into the higher velocities of the river. A hydraulic analysis would be needed to determine the benefits of each or a combination of these options.



Sedimentation from Spicer Creek at its confluence with the Niagara River (Map data: Google, 2015).

Reduce stream barriers in areas of known or probable interference with aquatic life.

Grand Island streams are continuously identified as priorities for fish barrier removal within the Greenway. In reference to the Niagara River Area of Concern and other aquatic related work being completed in the region, opening up access to important headwater spawning habitat for native migratory fish is an important initiative for Niagara River tributaries. Grand Island is a focus for this work due to the quality and amount of headwater wetland habitat that exist along its tributaries.

Niagara River Greenway Habitat Conservation Strategy

Out of all barriers identified along perennial streams within the Greenway, those located on Spicer and Big Sixmile Creeks are the best-bet opportunities for opening up fish passage. All three barriers along Spicer Creek result from vegetation jams and low water depths. Each barrier would require vegetation removal with some management of invasives like Phragmites. The three barriers along Big Sixmile Creek entail more complex retrofits than those along Spicer Creek. Barrier removal at each of the sites would involve the creation of a defined low water channel through the vegetation jam, possibly along with removal of some or most of the in-channel vegetation. These improvements would provide increased habitat for Largemouth Bass (*Micropterus salmoides*), Muskellunge, Northern Pike, White Sucker (*Catostomus commersonii*), minnow species, and various panfish species. The barrier located most downstream is a long flat culvert that presents high velocity flow conditions during flashy storm events and no resting cover for fish. Mitigation efforts include installation of baffles or engineered rock riffles to increase water depths, reduce velocities, and provide resting places for fish migrating upstream.



The first impassible barriers identified on Spicer (left) and Big Sixmile (right) Creeks.

Work with municipalities, land conservancies, and private owners to transform vulnerable woodlots into functional, resilient forests through protection and connection of existing lots.

A 44-acre parcel located along Love Road, owned by the Buffalo Ornithological Society, exhibits high ecological integrity and valuable habitat that has been unmanaged for some time. The habitat is mature forest with some wetland areas, and is located within an area identified as critical headwater forest. The main priority for this parcel is long-term protection as well as expansion where possible. The area would also benefit from some invasive species removal and presents opportunities for environmental education and recreation. More details about this opportunity can be found later in this section.



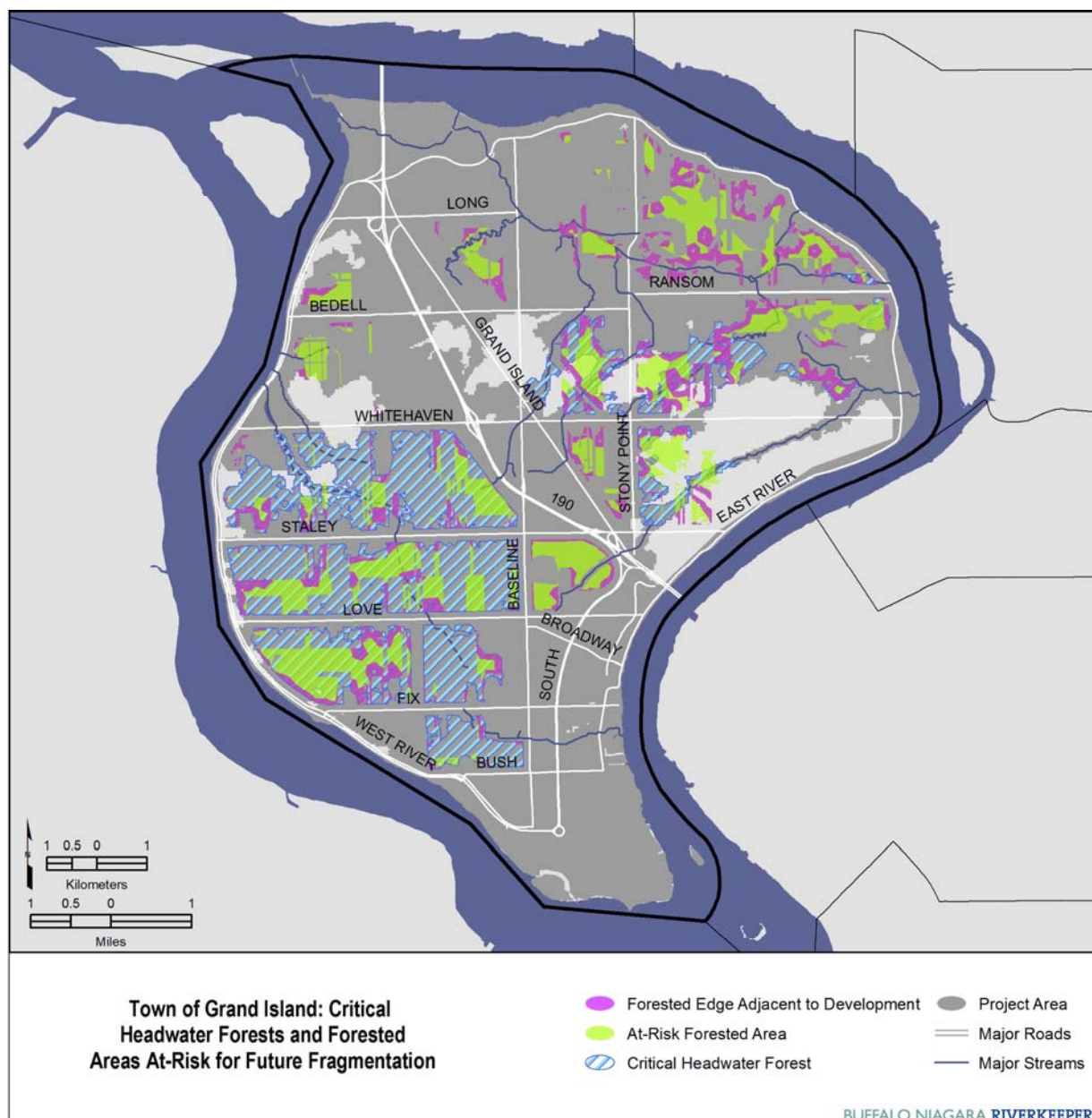
Quality forested wetland habitat existing within the Buffalo Ornithological Society parcel that is a priority for protection and expansion.

For public acquisition, prioritize escarpment and other headwater woodlands, remnant native communities, and parcels that will increase forest tract size to >100 acres.

Grand Island has the greatest amount of headwater forests (3,512 acres out of 5,786 acres total) and the largest patches of intact woodland and natural areas of all Greenway municipalities. These areas are a priority for preservation due to the fact that they offer: community resiliency to large storms, improved water quality and overall stream condition in all downstream areas, important habitat to wildlife, and act as buffers from disturbances. As Grand Island experiences growth and an increase in residential development, it is important that these features within the landscape are protected. As most of the forested areas on Grand Island are privately owned, ensuring protection will mandate the use of conservation easements, fee-simple acquisition, and enhanced environmental zoning protections (described more in the next Strategy).

Using desktop analysis, priority areas for protecting forests on Grand Island are shown in Map 4.38. Large forested areas (>100 acres, >100 meters from a road and not intersected by a right-of-way) which are currently undeveloped and unprotected are depicted as at-risk forested areas. Of these lands, a further analysis was completed to identify sensitive forest areas that lie adjacent to developed land covers having residential and agricultural uses. These sensitive forests are areas at greatest risk for future development based on their proximity to developed lands. By viewing sensitive forests in concert with critical headwater forests, it is easy to compare forests at greatest risk for future development to those containing the greatest value for species and water quality protection.

Map 4.38 Town of Grand Island: Critical Headwater Forests and Forested Areas At-Risk for Future Fragmentation



Implement SVAP recommendations.

In addition to the recommendations regarding increasing riparian habitat already mentioned, a number of opportunities for stream conservation were identified as a result of the SVAP investigation.

Conservation of riparian habitat throughout all assessed areas (Map 4.37) is an important objective in order to maintain the quality of the streams on Grand Island. These streams are regionally significant due to the fact that they are located in headwater areas and provide spawning and nursery habitat to native migratory fish. For these reasons it is important that they remain in good condition.

Invasive species along streams should also be addressed, especially in the following areas: Bedell Road to Veterans Park along Woods Creek, up and downstream of Ransom Road along Gun Creek, near Love Road along Big Sixmile Creek, and Reaches 2, 6, 7, and 23 on Spicer Creek (see Map 4.37 for reach locations). Phragmites and Purple Loosestrife were the main invasive species observed (Frothingham, 2014).

Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

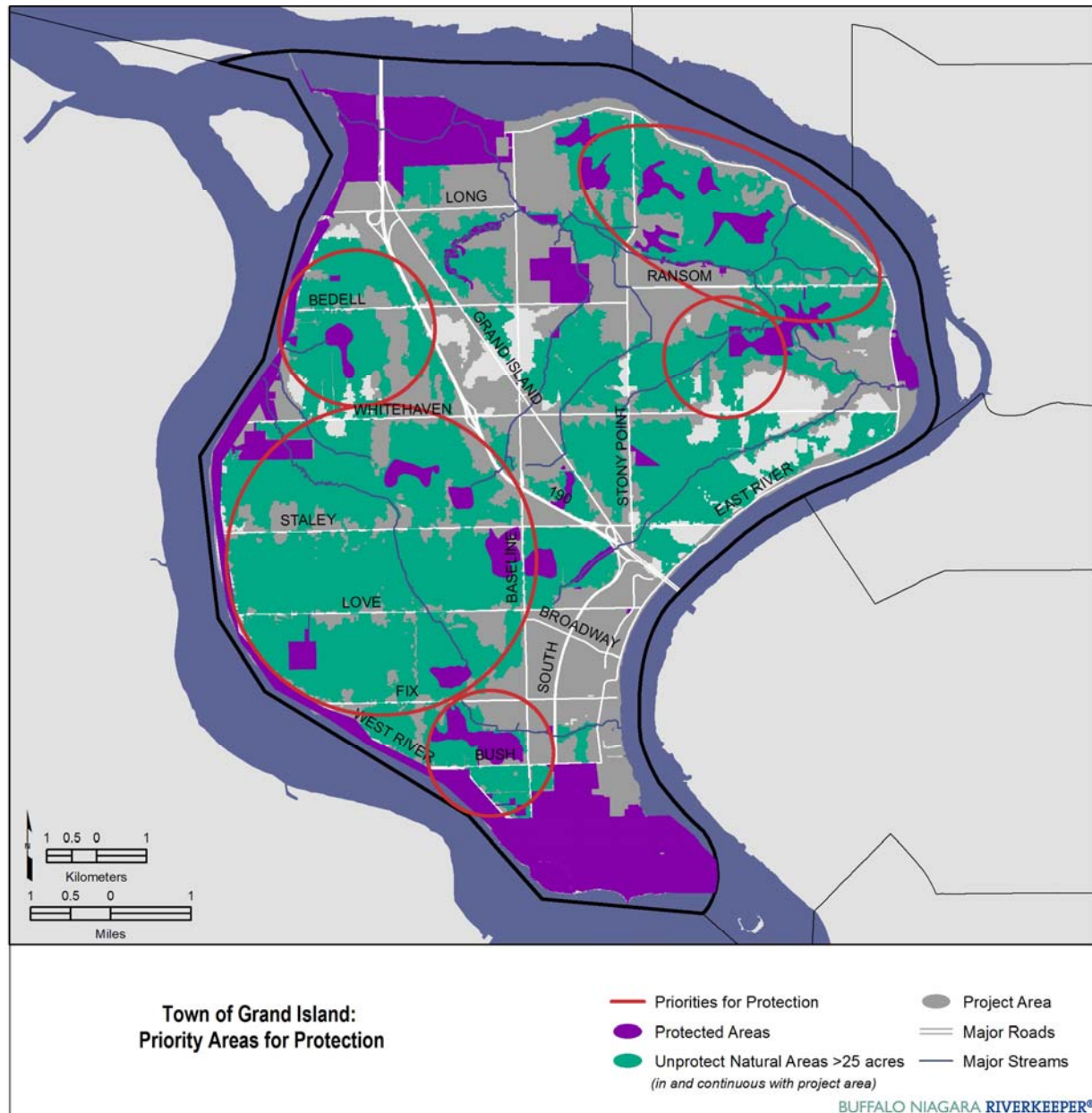
Grand Island's natural character and significant habitat features are a priority for protection and preservation as the town experiences increased growth and residential development. An in-depth assessment of the town's current regulatory framework and suggestions for improvement were identified through the Healthy Niagara: Niagara River Watershed Management Plan, Phase 1 (Buffalo Niagara Riverkeeper, 2014a). The township has been proactive in implementing techniques to direct new growth through their zoning code, conservation easement program, and active role of the Conservation Advisory Board in planning and zoning decisions. Although the town is progressive in supporting protection of natural areas, there are additional tools available that would enhance protection of key environmental features.

The current zoning code includes an Enhanced Environmental Overlay District (EED) that provides protections to Significant Coastal Fish and Wildlife Habitats and other sensitive habitats within the town. It is recommended that the current EED be expanded to include other important natural resources like riparian buffers along all waterbodies, the coastline surrounding the Island, and all high-functioning forest and wetland habitats. The town should also consider adding stronger regulatory language with regards to required width of riparian buffers (recommended at a minimum of 100 feet on either side of streams) and the management of mature trees (limit removal of trees and their canopy and require replacement of adequate mitigation ratios). Improved awareness and additional incentives associated with the easement program is also suggested to increase its effectiveness. Priority areas recommended for protection within the town are highlighted in Map 4.39.

Conversations with town officials and the Conservation Advisory Board have identified that the improvement of riparian buffer regulations and addressing water quality issues are priority initiatives for Grand Island. The first step in achieving this is developing a complete inventory of resources that would trigger preservation and protection when reviewing proposals for new development. Although some of the data completed through the Strategy like the detailed land cover analysis and SVAP results assist in providing this information, a complete and up-to-date inventory is required to effectively determine priority areas for protection and improvements. Once updated, the town would need to agree on the critical resources to be protected as well as identify a suite of tools that can be used to help achieve their protection and restoration.

Niagara River Greenway Habitat Conservation Strategy

Map 4.39 Town of Grand Island: Priority Areas for Protection



WEST RIVER PARKWAY

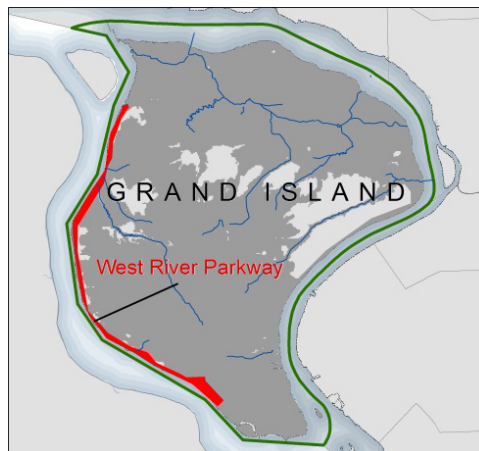
Municipality: Town of Grand Island

Acreage: 8.5 mile strip of land

Location: West River Pkwy

Ownership: New York State Office of Parks, Recreation and Historical Preservation

Site Description: Grand Island's West River Parkway connects two large State Parks, Beaver Island on the southern end and Buckhorn Island on the northern end. The 8.5-mile stretch of shoreline, bound by the parkway and the Chippewa Channel, is owned by the New York State OPRHP. Although the land is publically owned, private homeowners bordering the parkway maintain large stretches of it for recreational use and to preserve their vistas. Much of this management is done through mechanical and chemical removal of vegetation layers around permitted private docks. Grassland and woodland habitat can still be found throughout this corridor but it is patchy and fragmented. Much of the West River Parkway shoreline is exposed to prevailing southwest winds and strong waves. As a result, the nearshore substrate is primarily cobble and sand with significant amounts of large woody debris. Water depths are frequently between 1 to 3 feet although in some instances slightly higher depths were observed. Bank slopes along the southern portion of the parkway are steep and in some cases nearly vertical, becoming gentler in the northern portion. Site 90 is a good example of a gently sloped bank that serves as a public access point for launching canoes and kayaks (Map 4.41).



Conservation Strategy: Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

Proposed Action/Restoration Potential: One of the first steps in developing alternative solutions for the West River Parkway should be to hold a series of public meetings with landowners and the OPRHP, with the objective of identifying a common list of goals that address the actions on land that are compromising bank stability and habitat connectivity. Education and outreach materials should be developed that demonstrate the significance of this habitat and outline a list of bioengineering techniques that could be implemented.

Specific needs and recommendations that would help address the widespread issues found along the West River Parkway include:

- Establishing and expanding the vegetated buffer with native plant species to provide soil and shoreline stabilization, improve water quality, and preserve species diversity. Locations like Beaver Island State Park (Site 82- Map 4.40) should be planted with native grasses and wildflowers to add structural and functional diversity and create insect and pollinator habitat. Planting shrubs, such as Northern Bayberry and Silky Dogwood, along with tall trees such as Sycamore (*Platanus occidentalis*), Basswood, and Eastern Cottonwood would provide additional wildlife habitat and cover. Site 89 (Map 4.40) is an example of a site that is extensively mowed. Stiff-leaf Goldenrod, a NYS-listed threatened plant, was observed in abundance at this location.

Through landowner engagements this could be an opportunity to protect and potentially establish additional populations at nearby sites;

- Bank stabilization and toe erosion protection is needed in sections that are experiencing undercutting and general scour. Failing sections of concrete walls and areas that have been buttressed with large boulders could benefit from additional reinforcement to protect remaining vegetation. In areas where trees have fallen, cables could be used to secure them in order to provide erosion protection;
- Areas that already have riprap should be soil choked and planted with native vegetation, providing additional habitat and protection; and,
- The entire length of West River Parkway could benefit from Barrier Rock Reefs (BRR), which are constructed in the nearshore area. These BRRs would help prevent bank erosion by absorbing energy from boat wakes, prevailing winds, high flow, and icy conditions. This would also produce areas with calmer waters that would provide refuge habitat for fish spawning, juvenile and minnow fish species, amphibians and reptiles, and benthic organisms. The orientation and shape of the BRRs could be designed in a variety of ways that produce the desired benefit; however, the height of the structures should not exceed mean summer water elevations. This would ensure enough water can flow over top of the structures and would allow for sediment deposition closer to the shoreline and provide substrate for SAV and EAV.

Highest Priority Site Opportunities

Specific locations have been identified where mowing within the riparian zone is causing bank instability and failure. In these areas, lawn should be replaced with a riparian buffer that does not obstruct landowners' views. Bioengineering design methods and techniques also known as living shorelines, using native plant communities, can effectively reduce erosion, stabilize banks, and provide an aesthetically pleasing riparian habitat.

Site 83: This site has overhanging willows and other large trees, along with a thicket of Black Chokeberry (*Photinia melanocarpa*). Expanding the riparian buffer to the top of the riverbank and planting trees just above riprap for future shading of the shoreline would enhance this area. Since the height of the mowed bank is sufficiently tall, shrubs and short trees should be planted upslope of the existing riparian buffer so the view is not obscured. Invasive plant species at this site comprised a higher proportion of the vegetation relative to other sites along the West River Parkway with Mugwort, Common Buckthorn, and some Multiflora Rose accounting for approximately 25% of total vegetative cover. Invasive species control is recommended for this site before restoration planting occurs.

Site 90: This public access area and canoe/kayak launch is nearly entirely mowed lawn. The area from the shore to the toe of the slope could be planted with low-growing vegetation such as Willow and Dogwood shrubs. Site 93 could be used as a reference area to design and construct enhanced shoreline habitat. While maintaining a few open walking lanes for access to the canoe/kayak launch, the construction of an articulated concrete mat or a handicapped canoe/kayak launch, similar to those used at Beaver Island State Park, would support enhanced access. Addition of BRRs along the site would support emergent wetland vegetation and SAV planting/recruitment and provide for improved protection from prevailing winds, wave action, and boat wakes (Map 4.41).

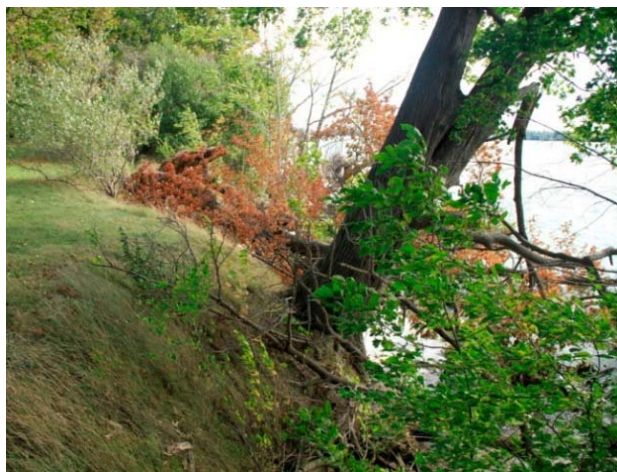
Site 92: This site is mowed to the water's edge, yet has potential to have a plant community similar to Site 93, but with more woody plants. Smooth Cordgrass (*Spartina alterniflora*), River Bulrush, and Jerusalem Artichoke (*Helianthus tuberosus*) are already present along the northern end. Invasive species

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control and management activities should occur following the early detection of European Black Alder. Reducing all mowed areas will support the creation of a larger riparian buffer. Low stone toe protection could be installed to increase bank stability. The addition of soil behind the rock will create terraces on the bank to support planting, habitat diversification, and soil stabilization. Alternatively, sloping the bank to 1:3 and planting with shrubs along the sloped bank and tree species on top of the riverbank would also enhance the entire extent of the riparian buffer at this location (Map 4.41).

Potential Implementers/Partners: OPRHP, Town of Grand Island

Potential Funding Sources: Niagara River Riparian Restoration Program, Sustain Our Great Lakes, Great Lakes Restoration Initiative, Great Lakes Basin Fish Habitat Partnership



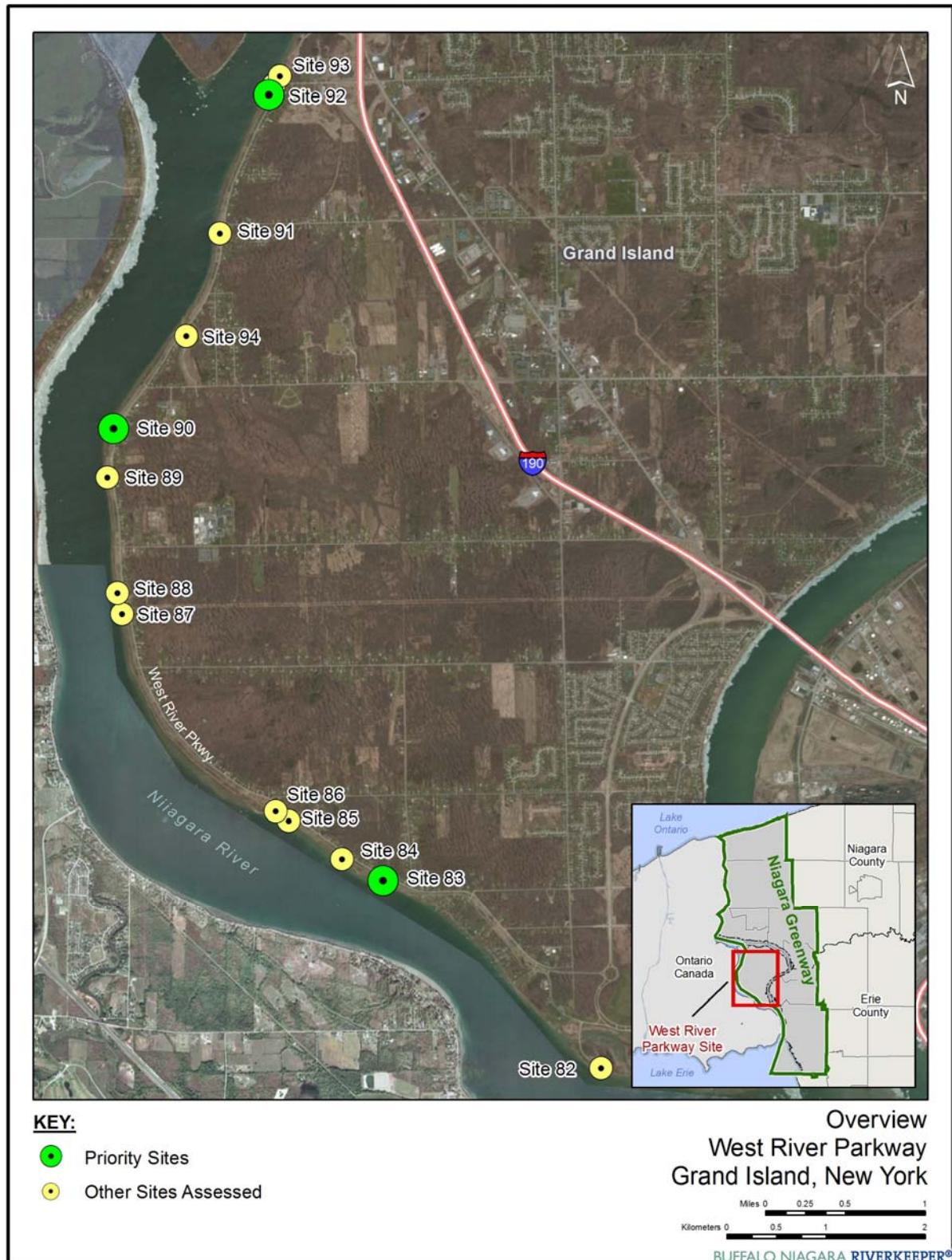
Left: Undermined bank and fallen trees along southern shore of Beaver Island State Park (Site 82). Right: Concrete wall at Site 84, facing south. The wall supports the steep bank; removal would likely cause bank failure.



Left: Site 90, facing north. This public access and canoe/kayak launch could be planted with shrubs along the toe of the slope. The construction of an articulated concrete mat or a handicapped canoe/kayak launch would support public access. Right: Site 93, facing north. This site is characterized by a diverse shoreline vegetation community that transitions gradually from an upland area to a naturally sloped bank into wetland emergent plants along the shoreline.

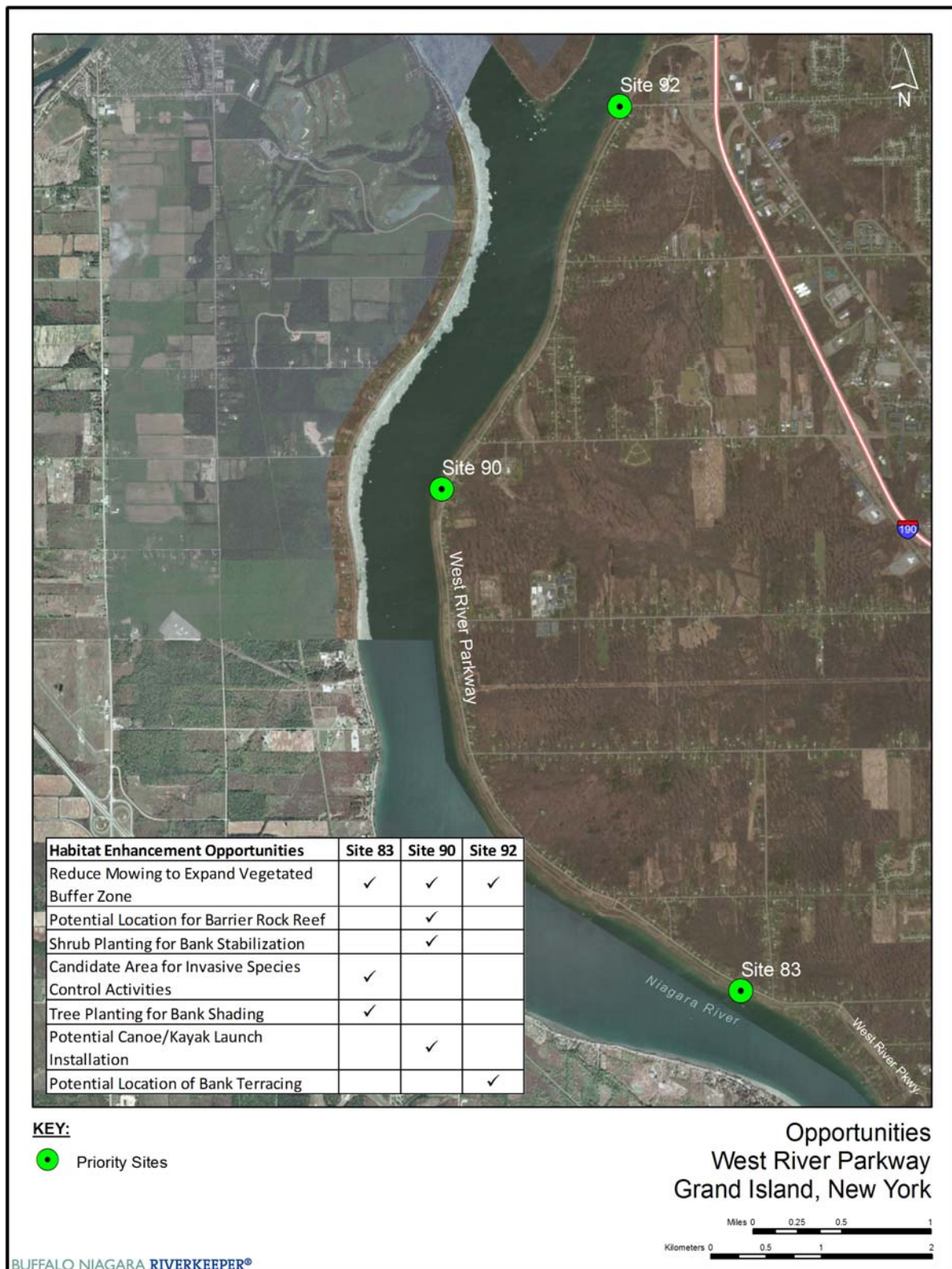
Niagara River Greenway Habitat Conservation Strategy

Map 4.40 West River Parkway: Overview



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Map 4.41 West River Parkway: Opportunities



BUFFALO ORNITHOLOGICAL SOCIETY PARCELS

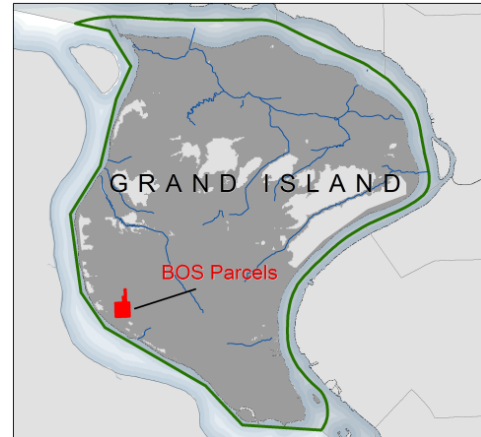
Municipality: Grand Island

Acreage: 44 acres

Location: Love Road

Ownership: Buffalo Ornithological Society

Site Description: This parcel is a mature hardwood forest bordered on three sides by extensions of undeveloped forested habitat and a road with residential development to the north. The forest contains a number of wetlands and pools of varying sizes and depths. The parcels have been owned by Buffalo Ornithological Society (BOS) for some time, but not have been actively managed in any way.



Depressional wetland areas provide excellent potential habitat for woodland amphibians and aquatic invertebrates. The various wetland pools have variable vegetation assemblages, including greater Bladder Sedge (*Carex intemescens*), Jewelweed (*Impatiens capensis*), and Wood Reed Grass (*Cinna arundinacea*), although the deeper pools tend to have little to no vegetation. One large wetland in the southwest quadrant has saturated soils, vegetated hummocks, and a deep circular depression that appears to be kept permanently wet as surrounding higher areas drain to the area. This wetland supports a large Buttonbush patch as well as Rice Cutgrass, Bladder Sedge, Tussock Sedge (*Carex stricta*), Hop Sedge (*Carex lupulina*), ferns, mosses, and Silver Maple (*Acer saccharinum*).

The majority of the site supports a mature, fairly even-aged upland hardwood forest. The canopy is primarily composed of Sugar Maple (*Acer saccharum*), Red Oak, and Black Oak (*Quercus velutina*) with variable canopy cover (40% to 70%) and very little understory structure. Black Cherry (*Prunus serotina*), Green Ash, and Shagbark Hickory are also present. Canopy trees are mature but appear to be less than 80 years old. Hophornbeam (*Ostrya virginiana*) is a common sub-canopy tree, with more Ironwood (*Carpinus caroliniana*) and American Beech (*Fagus grandifolia*) sapling stands in the central regions of the site. Scattered Multiflora Rose, Common Buckthorn, and Honeysuckle grow primarily in canopy gaps. There are large numbers of acorns in many portions of the site. There is evidence of deer browse on hardwood seedlings. Hardwood regeneration may be limited by deer herbivory. Ash is not a dominant tree, so Emerald Ash Borer is not a major threat to overall forest function.

Conservation Strategy: Work with municipalities, land conservancies, and private owners to transform vulnerable woodlots into functional, resilient forests through protection and connection of existing lots.

Proposed Action/Restoration Potential: The forest and wetland features on the BOS parcel site currently exhibit high ecological integrity and habitat value. Development of a management plan is the primary recommendation for the site (Map 4.42). Invasive species control and management activities would be desirable, particularly to prevent Common Buckthorn encroachment.

If desired, it may be possible to expand the areas of wetter habitat to promote connectivity between depressions within the forest. Such wetland enhancement should be weighed against any construction impacts to the site's quality.

Adjacent resource buffering and protection is warranted based on the existing high quality of the site. Based on E & E's site visit and review of aerial photographs, it appears that privately-owned areas to the east and west may have comparable habitat value and are worth protecting. Expanding and protecting the habitat value of the site by enacting natural resource easements on adjacent and nearby parcels would add acreage to contiguous, protected forest and help ensure connectivity to other forested areas on Grand Island. Large areas of continuous habitat are more likely to support a higher diversity of plants and wildlife and support viable populations of these species. These larger tracts not only offer cover, shelter, forage opportunities, but also are valuable as movement corridors for wildlife within the broader landscape. As a result of supporting healthy source populations, wildlife can disperse from areas of contiguous forest habitat to colonize or augment populations in smaller habitat fragments. Contiguous and well-connected habitat is especially important to plant and animal species that require interior forest habitat or are sensitive to habitat edge effects.

The northern strip of land leading to the larger parcels of the site is a Common Buckthorn thicket located between two houses (Map 4.43). The southern edge of the surveyed parcels and the property to the south appears to have been harvested, with only 15% canopy cover and heavily invaded and impacted by Common Buckthorn, along with Honeysuckle and Multiflora Rose, with invasive species cover ranging 35% to 70% (Map 4.43). Encroachment from the Buckthorn and other invasive species from the southern successional woodland is the primary stressor to the BOS site.

Creation of cavity trees and standing snags might be a viable option to create and enhance wildlife habitat, perhaps targeting stressed or diseased trees for crown removal as observed in DeVeaux Woods State Park. The addition of Spicebush (*Lindera* spp.) and berry-producing shrubs, where soils could support them, could increase foraging opportunities for songbirds and other wildlife.

Finally, there are opportunities for public access at this site. Renewed maintenance of existing trails could offer opportunities for outdoor education and interpretation. The wetland pools and isolated conifer stand offer habitat variation for wildlife within the site, and the relic farm pond could potentially be presented as an example of historic land use.

Potential Implementers/Partners: BOS, Town of Grand Island

Potential Funding Sources: BOS Special Projects Grant, Joint Venture Habitat Restoration and Protection (Great Lakes Restoration Initiative), Community Forest and Open Space Program

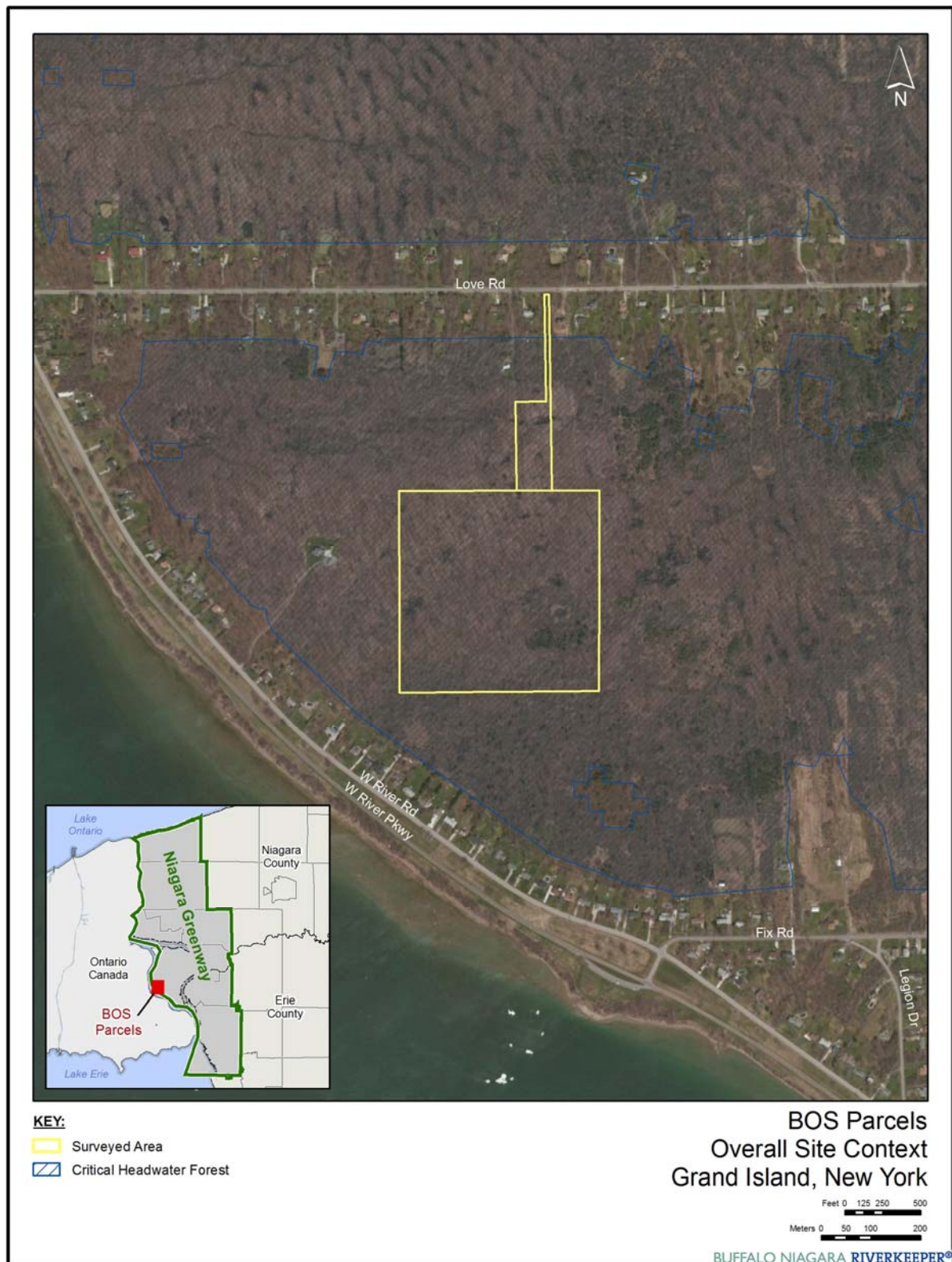
Niagara River Greenway Habitat Conservation Strategy



Left: Throughout the site there are depression wetlands of varying sizes and depths that appear to hold water most of the year. These pools are frequently associated with coarse woody debris and provide habitat for woodland amphibians. Many of the wetland pools would be connected during wetter times of the year. Right: The southwestern side of the BOS parcels. The south edge and property to the south appear to have been harvested, with low canopy cover and heavily impacted by Common Buckthorn in the shrub layer. Encroachment from the Buckthorn from the southern successional woodland is the primary stressor to the BOS site. Invasive species control and management activities are recommended.

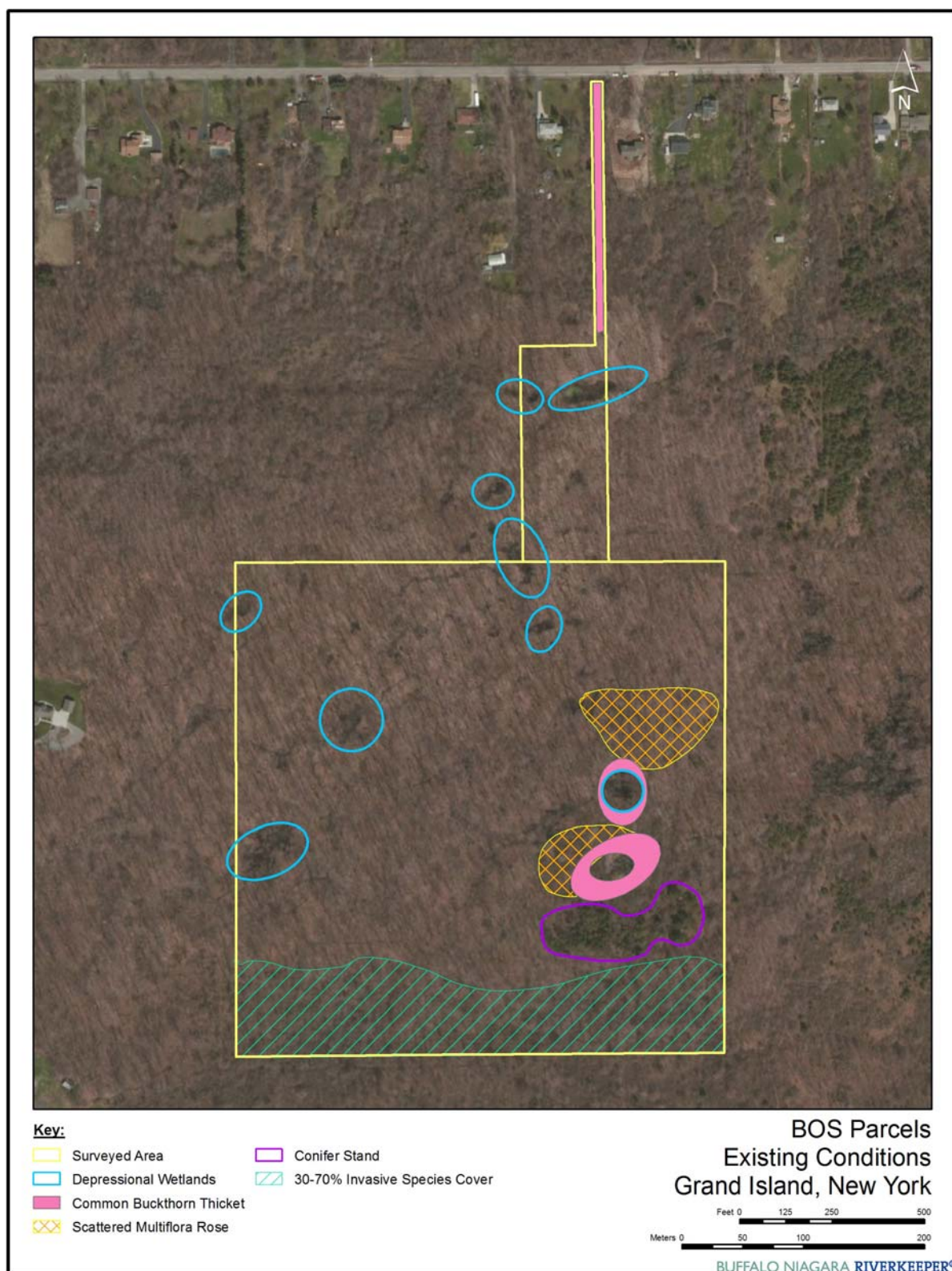
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Map 4.42 BOS Parcels: Overall Site Context



Niagara River Greenway Habitat Conservation Strategy

Map 4.43 BOS Parcels: Existing Conditions



4.9 City of Tonawanda

Existing Conditions:

The City of Tonawanda's strategic shipping location with waterfront land along the Niagara River and Erie Canal immediately north of the City of Buffalo has shaped its history and greatly impacted its land use. Today the city can be characterized as an urban center, and like much of Western New York over the last one hundred and fifty years it has passed through successive stages of agriculture, residential development, industrialization, and reverse urbanization. As a result of this past, the city contains the second lowest acreage of natural areas within the Greenway, with brownfields and landfills as the second highest. Most of the remaining terrestrial habitat of value in the city is located along the Two Mile Creek corridor and within Veteran's Park. This area was identified in the City of Tonawanda Local Waterfront Revitalization Plan (1987, amended 1993) as an important area to preserve and protect, detailing preservation of "a 300-foot wide Two Mile Creek corridor as landscaped open space." It should be noted that the city has several wonderful parks along the water that could provide additional opportunities for habitat creation. All are currently maintained as recreational space with minimal ecological value.

Stream function: Major tributaries to the Niagara River found within the city include Two Mile Creek, Ellicott Creek, and Tonawanda Creek (also referred to as the Erie Canal).

Population: 15,130 (2010 census)

Annual Growth Rate: -6.2% (2000-2010)

Existing Institutional Framework:

Comprehensive Plan, 2002

Local Waterfront Revitalization Plan (LWRP), 1987, amended 1993 (*currently being updated*)

Code of Ordinances/Zoning, 2014

Recommendations:

Habitat in the City of Tonawanda:

Total Municipality: 2,624 acres

Project Area: 1,577 acres (60.1% of municipality, 1.8% of total project area)

NHD Streams: 5.74 miles

Coastline: 1.9 miles

Wetlands: 42 acres

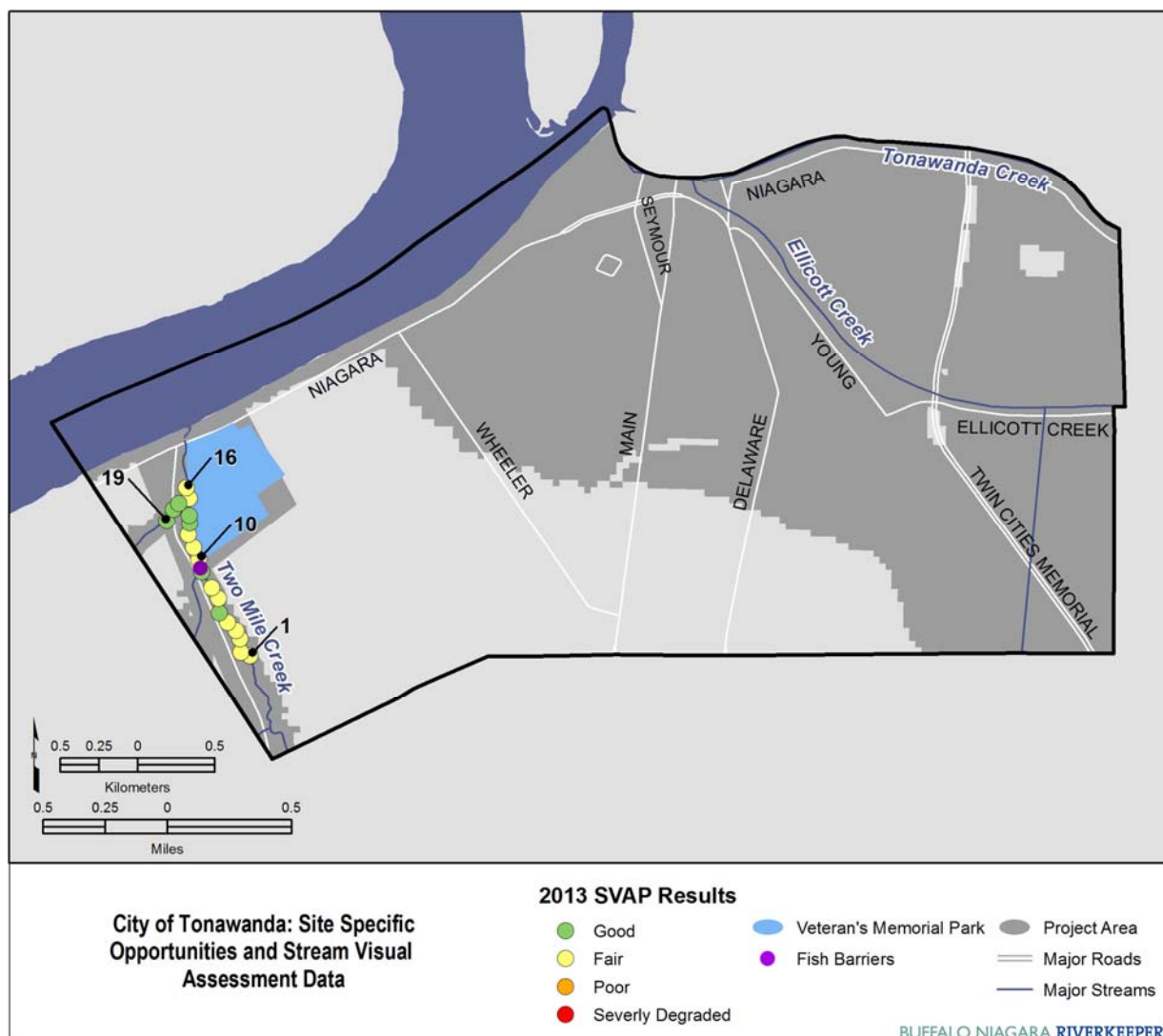
Woodlands: 30 acres

Grass/Shrublands: 9 acres

Natural Areas: 81 acres

Due to the limited existing habitat within the city, Two Mile Creek is a priority for preservation as a vestige of both its historical importance and significance to contribute to building a Greenway. Land use changes in Veteran's Memorial Park, located near the mouth of Two Mile Creek should be carefully considered so as to protect the integrity of the remaining habitat located within the park as well as within the nearby stream corridor. Other important priorities for improving habitat within the city include invasive species management, riparian buffer enhancement, and stream bank stabilization. Management of stormwater discharge was also noted in the City of Tonawanda original LWRP as a priority for all major tributaries within the city.

Map 4.44 City of Tonawanda: Site-Specific Opportunities and Stream Visual Assessment Data



Note: SVAP data displayed corresponds to overall score for each Reach from 2013 assessment. Overall 19 reaches were assessed within the City, with reaches 1-16 located along Two Mile Creek and 17-19 extending along a tributary.

Increase stream buffers, especially where connectivity to active floodplains, riparian wetlands, or other habitats is enhanced or where problems with runoff, flooding, and/or erosion are known to exist.

All three tributaries to the Niagara River located within the city have experienced moderate to severe losses in riparian buffers and wetlands. Stream buffers provide a critical function in providing bank stability, protecting water quality, hydrology, and watershed ecosystem function, and also offering vital habitat corridors for terrestrial and aquatic wildlife. It is important that riparian areas are preserved and expanded where possible within the city.

As previously indicated, Two Mile Creek has a fairly intact riparian corridor with over half of the reaches surveyed containing riparian zones in good condition. Areas that could benefit from riparian habitat

enhancements include Reaches 5 and 9-11 (Map 4.44). Preserving and enhancing the riparian habitat in these locations would also help protect the abundant amount of instream habitat along Two Mile Creek including deep pools and coarse bed substrate that are ideal for supporting aquatic species. This action will also help prevent algae growth in the creek associated with runoff and nutrient loading (Frothingham, 2014).

Work with public and private landowners on best management practices to gain maximum ecosystem and economic values of wetlands including stormwater retention and filtration, native species diversity, and beauty.

Although the city does not hold a vast amount of wetland habitat, one significant area that contains upland and riparian habitat exists within Veteran's Memorial Park and the Two Mile Creek corridor. Planned residential development and mowing regimes pose a threat to the long-term existence of this habitat, which is one of the only remaining wetland areas within the city. By applying sound planning principles and best management practices to this area, which are explained more in detail later on in this section, ecosystem services and economic values of this habitat could be maximized while preserving a natural area that is significant within the context of the Greenway.

Implement SVAP recommendations.

The average SVAP scores for Two Mile Creek were "fair." Shoreline cleanups and public education would be useful to help reduce litter problems along the whole creek. Invasive species control is also needed throughout the creek corridor with some invasive species (Phragmites, Japanese Knotweed, and Purple Loosestrife) showing up in several reaches that warrant management to promote the presence of native species. Improvements to channel conditions and bank stabilization are needed in the upstream section of the creek along Two Mile Creek Rd (Reaches 1-5; Frothingham, 2014).

Reduce stream barriers in areas of known or probable interference with aquatic life.

One barrier along Two Mile Creek was identified through field assessments (see Map 4.44 for location). This barrier warrants mitigation in order to open up spawning habitat and allow minnow, darter, panfish, Northern Pike, and bass species to access upper reaches of the stream. A second barrier is located just upstream of this one within the Town of Tonawanda, and should be addressed in order to maximize the total amount of accessible spawning habitat.

The barrier identified within the city is a long, flat culvert with potential velocity, flow regime and jump height barriers presenting impassible conditions for fish traveling upstream along Two Mile Creek. Mitigation options include step pools to mitigate the jump height barrier and baffles within the culvert to create cover and provide resting opportunities.



This box culvert along Two Mile Creek includes an approximately six inch ledge that presents impassible conditions for warmwater fish species.

Increase habitat values of protected natural areas through improved management practices on public lands.



Shoreline improvements implemented in 2014 at Nia-Wanda Park.

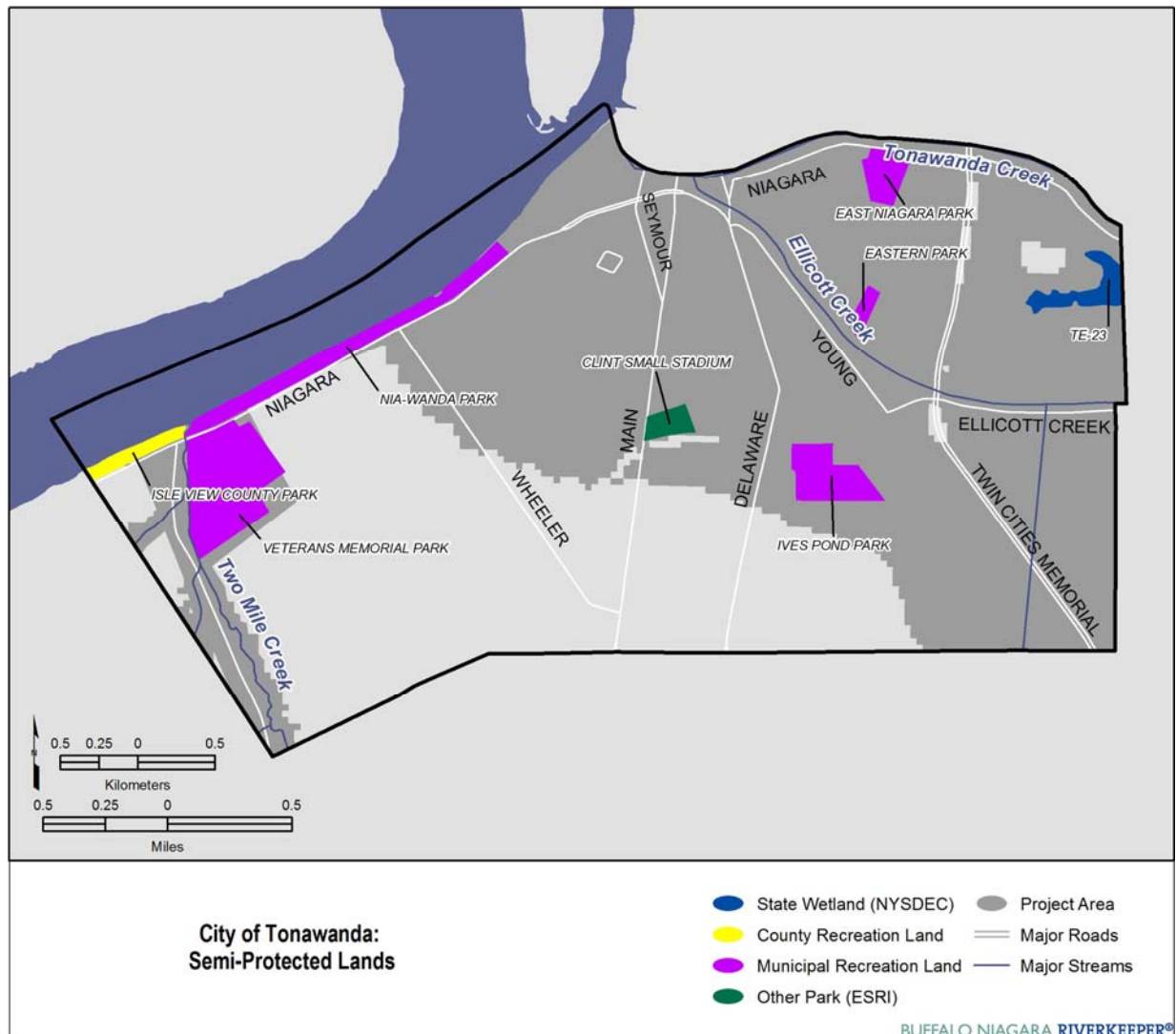
The City of Tonawanda has a considerable amount of parks and other public lands that would benefit from improved management practices including reducing mowing where possible, invasive species management, implementing buffers in waterfront areas, and ensuring no net increase in impervious surfaces (refer to Chapter 3 Strategy 13 for more information and Map 4.45 for locations of protected areas). The city has already taken steps to improve riparian areas on public lands, as a pilot project for shoreline stabilization and vegetation was implemented by DEC at Nia-Wanda Park this year.

The project aims to reduce erosion and provide habitat and vegetation that is valuable to wildlife while maintaining views and access to the water. If

the project is viable given the harsh storms and water level fluctuations observed along the Niagara River shoreline, additional shoreline softening techniques should be applied to areas where riparian vegetation is lacking within the city and along the river corridor.

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Map 4.45 City of Tonawanda: Semi-Protected Lands



VETERAN'S MEMORIAL PARK

Municipality: City of Tonawanda

Acreage: 32 acres

Location: Niagara Street

Ownership: City of Tonawanda



Site Description: Veteran's Memorial Park is primarily a developed recreational space with picnic areas, ball fields, mowed turf, and a bike path. Habitat features within and adjacent to the park include Two Mile Creek which flows along the southwestern boundary, as well as forested habitat along the stream corridor. Wetland habitat in the park consists of two small fragmented forested wetlands and one small emergent wetland, located adjacent to a mowed section of the park (Map 4.46). The forested wetlands appear to hold water for extended periods when inundated during spring thaws or heavy precipitation events. The emergent wetland can be characterized as a low depression that has a tight clay layer near the surface, allowing surface water to collect from the surrounding area. Wetland vegetation such as sedges and rushes grow in this low area. Plant species associated with wetlands and indicators of periodic water retention can be found in all three areas.

Two additional areas along Two Mile Creek located beyond the boundaries of Veteran's Memorial Park were assessed for habitat opportunities within the city. Historically, Two Mile Creek was one of the most biologically productive areas on the Niagara River but due to channelization, loss of canopy cover, improper stormwater management, and industrial runoff the water quality and habitat has diminished. An additional wetland swale separating two elevated ridges can be found in the city-owned property west of Two Mile Creek Road. This area supports mature oak-hickory woodlands. Shellbark Hickory, a state-listed species, has been preliminarily identified in this area but has yet to be confirmed.

Conservation Strategy: Work with public and private landowners on best management practices to gain maximum ecosystem and economic values of wetlands including stormwater retention and filtration, native species diversity, and beauty.

Proposed Action/Restoration Potential: Habitat opportunities within Veteran's Memorial Park and along the Two Mile Creek corridor should focus on protecting existing features from disturbances and improving upon habitat, especially in regard to the riparian zone. Current park management, residential development, and invasive species are the primary stressors that are affecting habitat quality. Several restoration techniques are suggested below to enhance the riparian corridor, creek channel, and wetland areas:

Stream and Riparian Habitat Enhancements (along assessed portion of Two Mile Creek- Map 4.48):

- Lower the bank to reconnect the floodplain in Reaches 1-5 as well as in selected spots downstream where invasive species are mechanically or chemically treated. Place engineered rock riffle structures in the incised channel area and on straightaways to address incision;

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- Place appropriately sized and shaped rocks along the bank near Reach 8 to prevent a large tree from falling over;
- Place traffic control stones and plant along shorelines in areas experiencing erosion, specifically for Reaches 8-12;
- Plant species providing overhead cover at Reach 9 near the Fletcher Road bridge crossing;
- A discharge site was observed at Reach 10 that should be mulched, seeded, and planted with native plant species to address erosion and prevent discharge from entering the creek; and,
- Consider lowering the bank at Reach 10 where right descending bank is 2 to 4 feet high.

Wetland Habitat Enhancements:

- Expand wetland areas by modifying all or part of the current mowing regime in locations around the emergent wetland and between the two forested wetlands. Expansion could be accomplished through minor grading in order to connect the adjacent managed turf areas to the wetlands in the wooded areas and to redirect stormwater runoff and extend groundwater recharge in these areas. Utilize this as an opportunity to create a living infrastructure demonstration project to provide ecological function and stormwater management (Map 4.47);
- Include stand-alone opportunities such as reducing or ending mowing activities in direct vicinities of the wetlands, completing some minor grading to lower the ground elevation, and seeding and/or planting of these areas. Soil profiles should be collected to determine depth of tight clay layer to ensure that grading does not extend below the clay layer. This area also presents opportunities for expanding habitat beneficial to herpetofauna. This, along with creation of educational elements could both be implemented without requiring a lot of funding;
- Introduce a vegetated wetland buffer (50-100 feet) composed of native tree and shrub species to protect aquatic habitat, water quality, and mitigate encroachment-related disturbance; and,
- For the property west of Two Mile Creek Road, control and manage invasive plants and restore native plant communities within parcel boundaries. This action would protect the biological integrity of the existing, high-quality habitat.

Upland and Riparian Forest Habitat Enhancements:

- Protect the remaining forested areas from potential residential development through conservation easement or municipal restrictions;
- Complete invasive plant control. Particular attention should be paid to a small patch of Phragmites in the eastern portion of the park to ensure it does not spread; and,
- Green Ash is one of the predominant tree species in the park, so early detection of Emerald Ash Borer could prevent significant tree loss.

Potential Implementers/Partners: City of Tonawanda

Potential Funding Sources: Urban Waters Restoration Program, Blue Water Project Community and Leadership Grants, FWS Endangered Species Great Lakes Restoration Initiative

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Left: Permitted discharge location along Two Mile Creek downstream of the Fletcher Street Bridge. A need for erosion and sediment controls were observed at this location. Recommendations include mulching, seeding, and plantings to address soil erosion and to restore riparian structure. The installation of a rock splash apron for the discharge and in-stream structure would also enhance fish habitat. Right: A view of Two Mile Creek looking upstream from Fletcher Street Bridge. A lack of overhanging vegetation and disturbance due to drainage associated with construction is evident.

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Map 4.46 Veteran's Memorial Park: Existing Conditions



Map 4.47 Veteran's Memorial Park: Opportunities



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Map 4.48 Two Mile Creek Stream Opportunities



4.10 Town of Tonawanda

Existing Conditions:

The Town of Tonawanda features mostly suburban development as a first ring suburb of the City of Buffalo. The town also contains major industrial areas along to Niagara River waterfront, limiting opportunities for citizen access despite over 25,000 feet of water frontage. The third greatest acreage of grasslands (219 acres) exists within the town next to the City of Buffalo and Town of Niagara. Although natural habitat within the town is sparse, opportunities exist to enhance, expand, and connect existing grassland areas especially on abandoned lands along the waterfront.

Stream function: The headwaters of Two Mile Creek originate within the town. A portion of Tonawanda and Ellicott Creeks also flow through the town.

Population: 58,144 (2010 census)

Annual Growth Rate: -5.8% (2000-2010)

Existing Institutional Framework:

LWRP, 1993 & 2008 – updated

Comprehensive Plan, 2005

Water Front Rezoning Study, 2002

Recommendations:

Habitat in the Town of Tonawanda:

Total Municipality: 13,056 acres

Project Area: 5,722 acres (43.8% of municipality, 6.8 % of total project area)

NHD Streams: 15.8 miles

Coastline: 5.7 miles

Wetlands: 349 acres

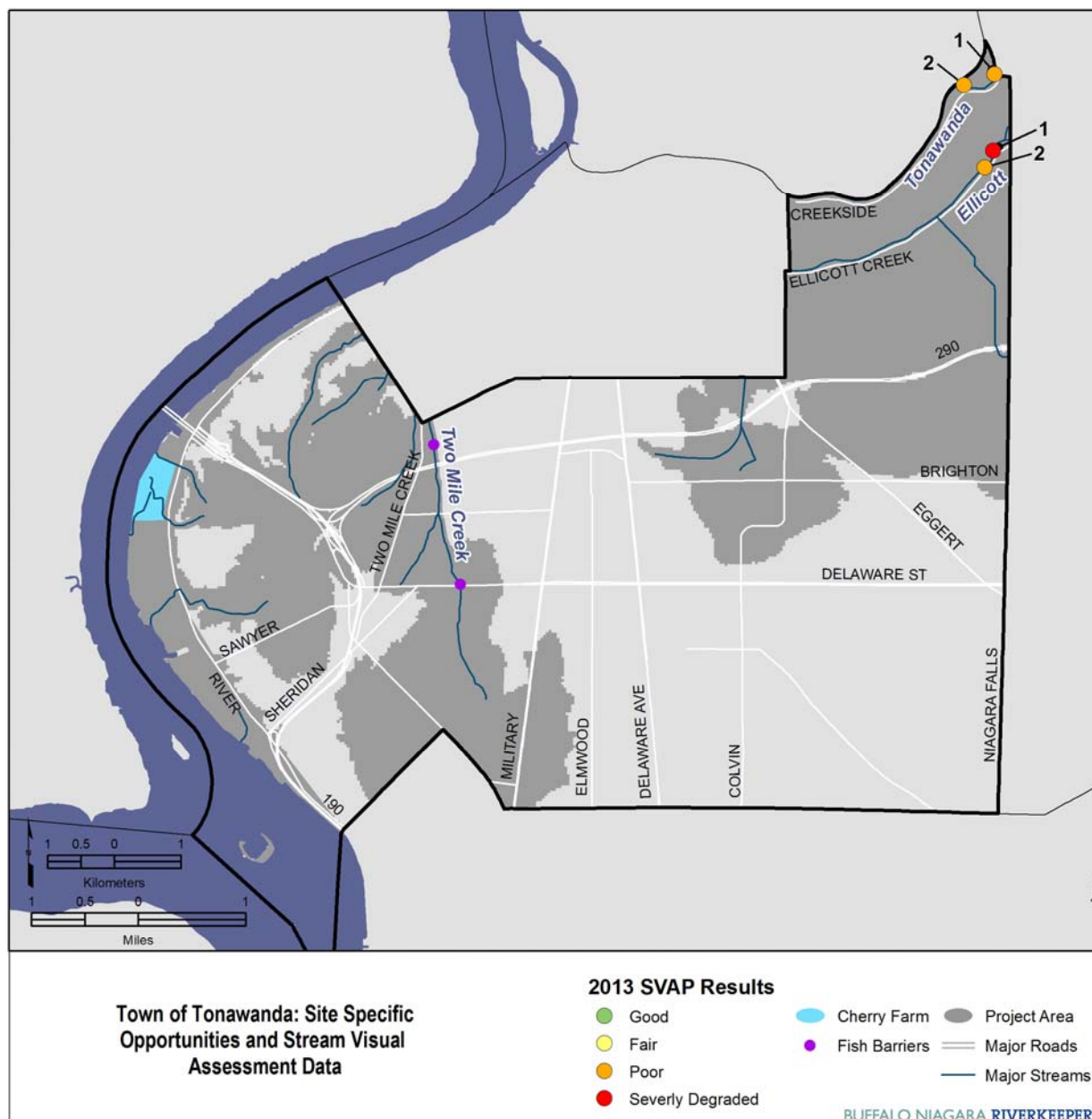
Woodlands: 259 acres

Grass/Shrublands: 219 acres

Natural Areas: 826 acres

Habitat restoration along the Town of Tonawanda's waterfront is a priority due to its location along the Niagara River corridor. Cherry Farm, once one of the most productive wetlands along the river, is the primary location for grassland restoration along with aquatic and wetland enhancements within the town. Other abandoned industrial lands in the vicinity should be considered for habitat enhancement to build upon the habitat potential at Cherry Farm. In addition to these opportunities, addressing barriers to fish and improving stream condition through management techniques and policy related tools are recommended priorities.

Map 4.49 Town of Tonawanda: Site-Specific Opportunities and Stream Visual Assessment Data

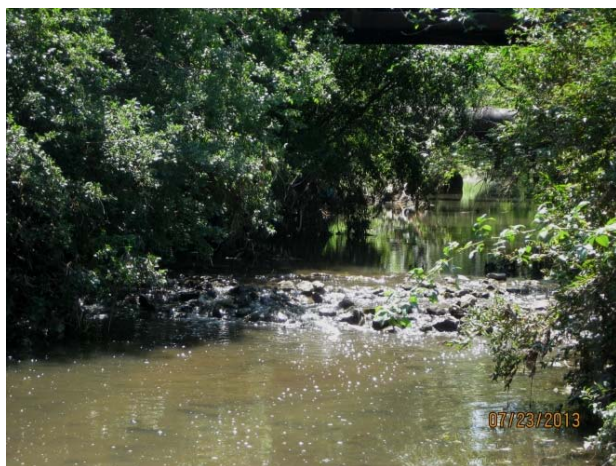


Reduce stream barriers in areas of known or probable interference with aquatic life.

Two of the three barriers to fish identified along Two Mile Creek fall within the town. An additional barrier downstream within the City of Tonawanda should be addressed before moving forward with these two sites. When traveling upstream from the river, the first barrier impeding passage within the town just north of I-290 is a steep rock riffle that would need a reduction in slope to 20:1 for ideal passage conditions. The second barrier at Delaware Road is caused by dense vegetation restricting flow under the roadway. Mitigation options include vegetation removal and reconstructing the channel to allow for passage in low flow conditions. Treatment of Phragmites on the upstream side of this barrier should be included in mitigation actions. Barrier removal would allow minnow, darter, panfish,

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Northern Pike, and bass species to access upper reaches of the stream. Further investigation into concerns of toxic contamination in the vicinity of Two Mile Creek should occur prior to on-the-ground work in this area. See Map 4.49 for barrier locations.



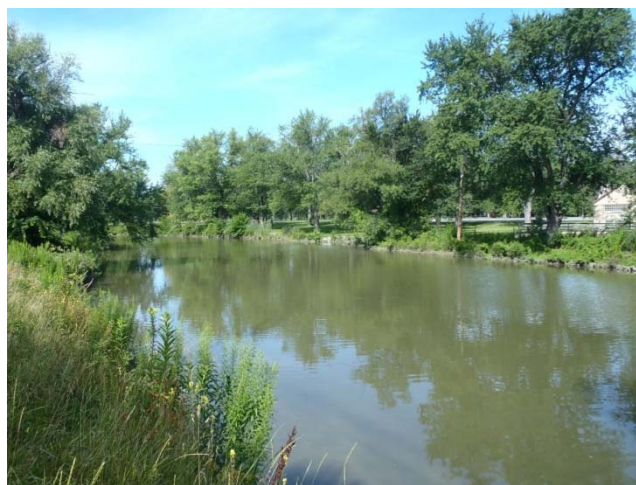
Left: Rock riffle that is the second barrier to fish along Two Mile Creek. Right: Dense vegetation on both the upside and downside inhibits passage to headwater areas.

Implement SVAP recommendations.

Within the town, two sites on both Ellicott and Tonawanda Creeks were surveyed as part of the SVAP effort (Map 4.49). These reaches had scores in the “poor” category mainly due to poor channel condition, bank condition, riparian zone, and water appearance scores. In these stream reaches conditions can be characterized as channelized with riprap and other hardened structures. The narrow riparian areas are less than half the channel width and all the reaches have Purple Loosestrife and Phragmites present. The water is turbid in this section most if not all the time and water chestnut seeds were found in both creeks. Aquatic vegetation was present in all four reaches which provides food and shelter for wildlife and improves water quality. Recommendations to address some of the issues found along these reaches are invasive species removal and management, riparian zone improvements, and shoreline cleanups to address litter (Frothingham, 2014).

Incorporate creation of native grassland meadows into remediation of landfills, brownfields, or other abandoned lands in the river corridor.

Much of the land uses within the Town of Tonawanda, particularly along the waterfront, consist of vacant, industrial, and commercial properties. The location of the town along the river corridor, Important Bird Area, and just downstream of important spawning areas located near Strawberry, Motor, and Beaver Island shallows along with the East River Marsh, is significant in terms of its potential to provide wildlife habitat for both aquatic and terrestrial



Reach 2 on Ellicott Creek exhibits turbid water and narrow riparian areas.

species. These waterfront lands also hold potential to be tied into the Greenway Trail and present scenic waterfront overlooks and wildlife viewing.

Many of the waterfront land uses within the town consist of vacant industrial, landfill, and brownfield uses. Because of the limited ability to use these lands due to contamination issues, transitioning them into low-maintenance grasslands is often the best reuse on vacant industrial and landfill properties; therefore, grassland restoration is a priority within the town. Map 4.50 combines the results from two desktop analyses to show potential opportunities for grassland protection, expansion, and connectivity. Existing areas of grassland over 10 acres are identified through 2010 NOAA land cover data. Erie County parcel data was then used to select vacant and/or non-residential parcels that could potentially connect or expand upon existing grasslands. Additionally, brownfield and landfill areas that are capped and grassed over are shown on the map to present additional opportunities for enhancing and expanding upon grassland areas.



View from the south end of Cherry Farm looking north. This site has great potential for grassland bird habitat restoration.

The portion of the town along the Niagara River was once the second largest marsh in the upper river, historically referred to as Rattlesnake Island. Over time the island was filled in and used for the disposal of steel manufacturing byproducts along with other industrial wastes. Currently this area, now called Cherry Farm, is capped and maintained as grassland, with a DEC wetland surrounding the property and some in-water features to provide stabilization and aquatic habitat. This is a high priority site for additional restoration within the Greenway. Recommended habitat restoration actions include improving the diversity and value of the grassland cap, removing invasives within the wetland area, adding shoreline vegetation and fish attraction structures, and potentially creating connectivity between the river and the wetland area surrounding the property. This site also has potential to contribute to the restoration goals related to the Niagara River Area of Concern. More information about this site is found later in this section.

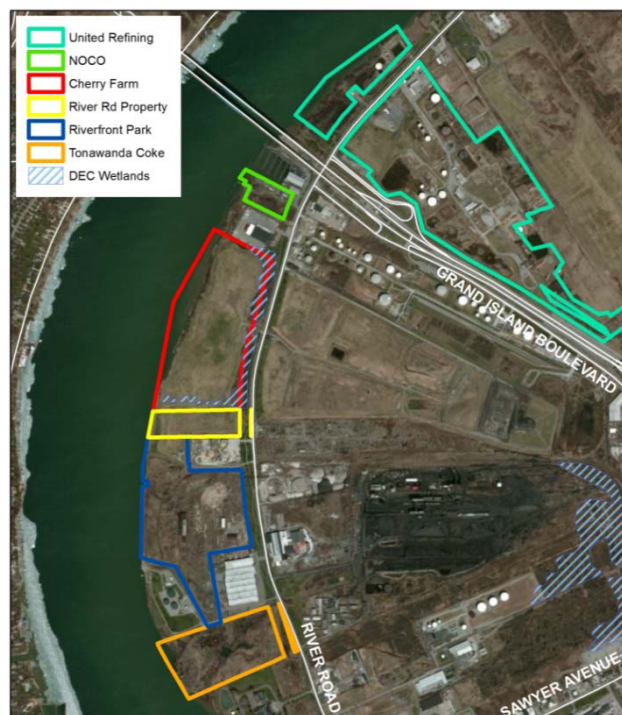


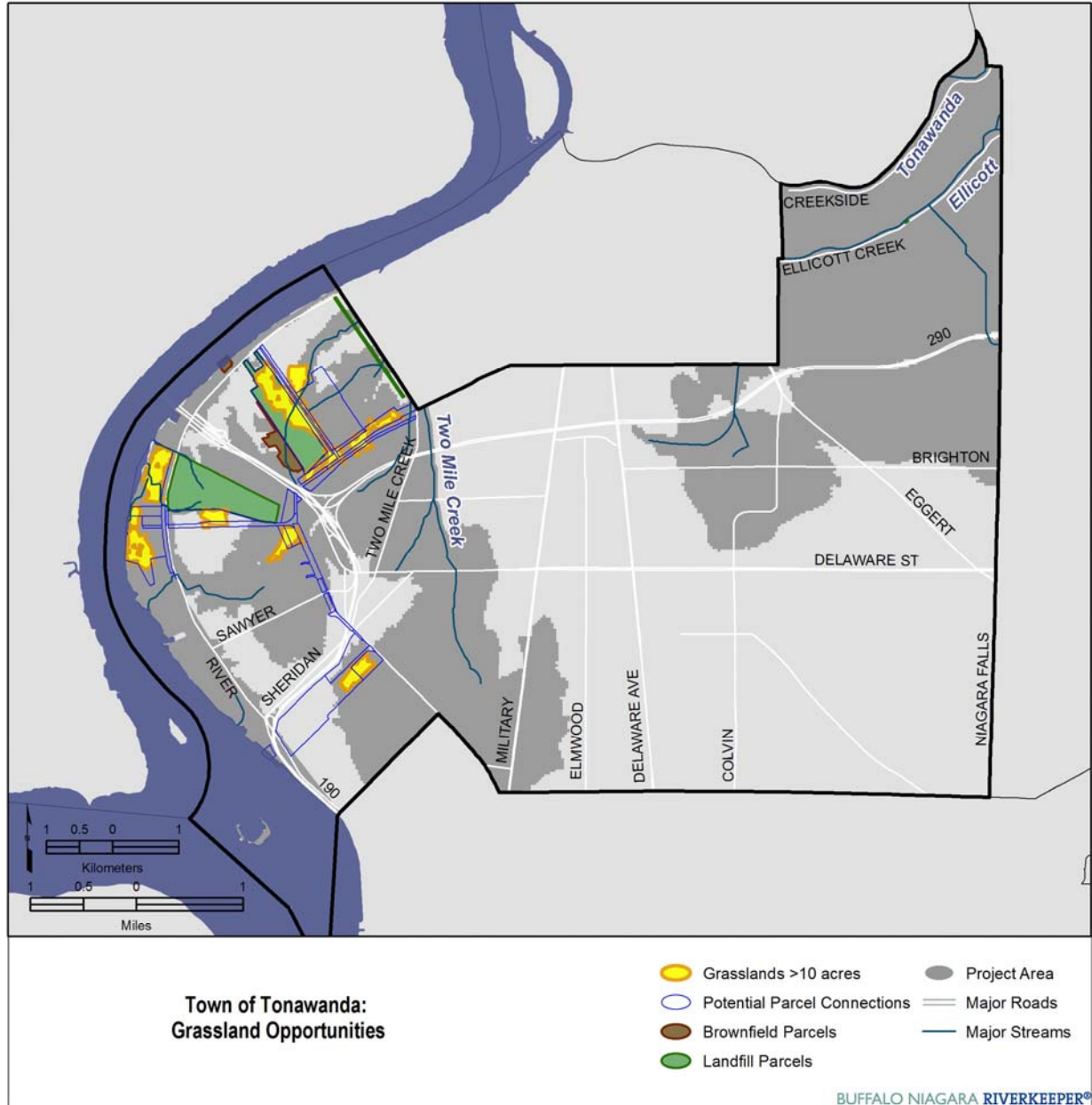
Figure 4.4 Vacant lands along the Town of Tonawanda waterfront that present potential for habitat restoration.

Additional vacant lands surrounding Cherry Farm should also be considered for their habitat potential (Figure 4.4). Future uses in many of these areas are limited due to contamination issues, therefore maximizing the quality and connectivity of habitat within this area is the best option for productive future use of prime

Niagara River Greenway Habitat Conservation Strategy

waterfront lands The parcels owned by United Refining and NOCO north of Cherry Farm are notable for their existing habitat that is mostly undisturbed, forested wetland. These areas are a priority for protection in perpetuity.

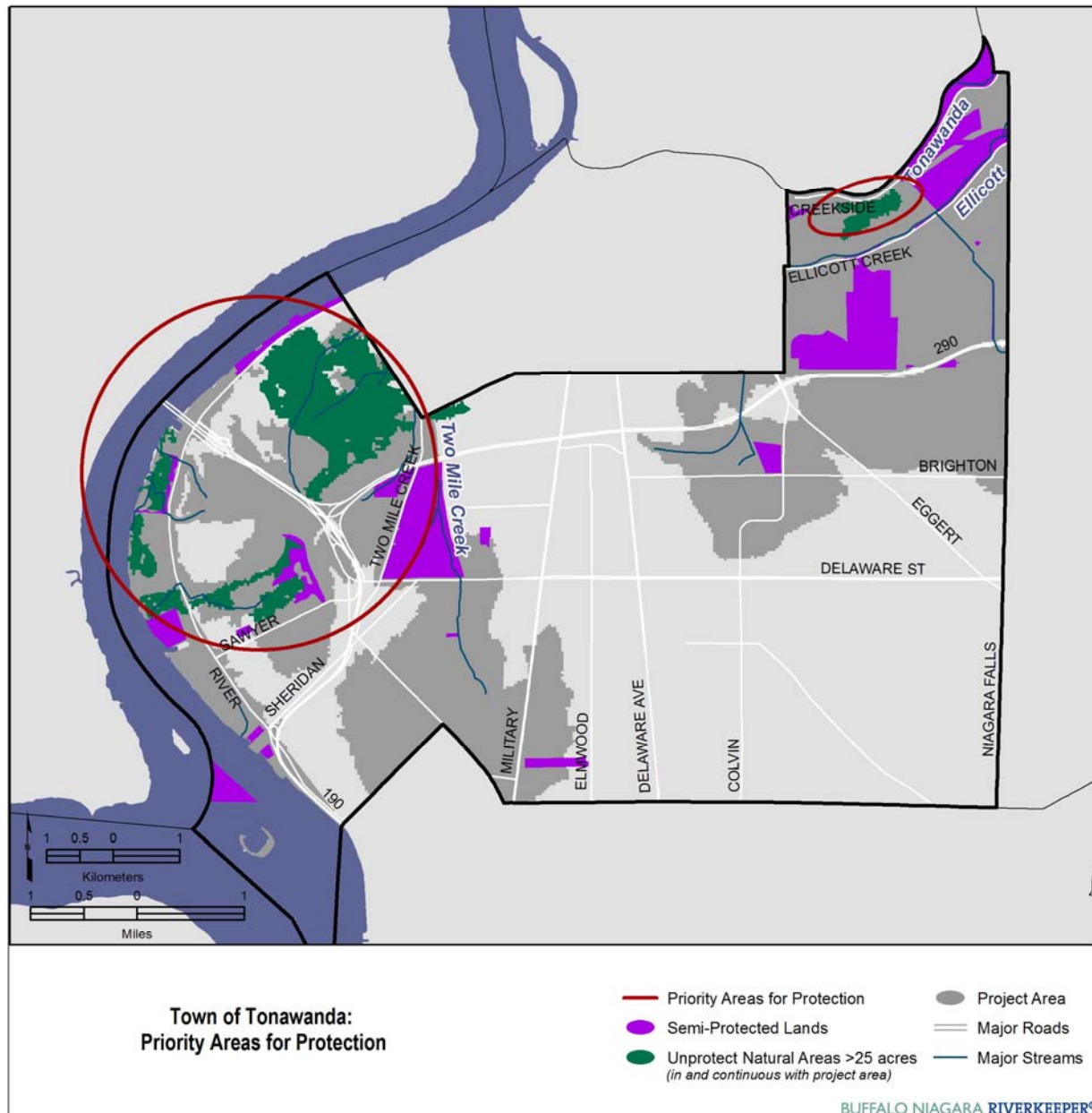
Map 4.50 Town of Tonawanda: Grassland Opportunities



Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Large areas of unprotected land within the Town of Tonawanda along the Niagara River waterfront and Tonawanda Creek are a priority for protection. Connectivity to already semi-protected areas should be maximized when considering implementation of these opportunities (Map 4.51).

Map 4.51 Town of Tonawanda: Priority Areas for Protection



Build partnerships with and between municipalities to connect and increase ecological values of coastal zones, stream corridors, and other shared habitat features through best management practices and ecology-based planning and zoning regulations.

Although the Town of Tonawanda is proactive in protecting water resources through regulatory mechanisms, room for improvement to enhance habitat within the town exists. The town's waterways and shorelines are protected through sewer, stormwater, and erosion and sediment control provisions. Opportunities exist to expand zoning protections through increased shoreline setbacks and riparian buffer protection and restoration requirements. The town would also benefit from being proactive about opportunities to implement living shoreline projects to enhance shoreline stability, as current actions to address shoreline stability happen mainly as a result of catastrophic erosion events and/or due to complaints by property owners. Soft (rather than hard) engineering techniques should be applied in areas experiencing erosion, and property owners should be educated about the maintenance practices for riparian vegetation to improve the conditions and ecological values associated with coastal areas. Habitat within the town would also be greatly improved through protection of existing wetland areas rather than mitigating the loss of wetlands in other areas outside of the town. Additional regulatory priorities for the town identified through the Healthy Niagara: Niagara River Watershed Management Plan (Phase 1, 2014) include:

- Provide additional shoreline protections to the Niagara River, Two Mile Creek, Ellicott Creek, and Tonawanda Creek by increasing development setback distances and maintaining consistent setbacks throughout the entire shoreline (despite varying zoning districts);
- Develop zoning provisions that maintain and restore vegetative buffers in riparian areas, including shorelines, wetlands, floodplains, and special habitats with preferences for native vegetation;
- Create zoning provisions that limit the creation of impervious surfaces and encourage the use of green stormwater infrastructure (i.e. lot coverage, porous materials);
- Conduct waterfront property owner outreach and education on limiting stream bank erosion and improving stability through maintaining naturalized, living shorelines and riparian vegetation;
- Update zoning provisions to reflect and strengthen the policies outlined in the Town of Tonawanda's Local Waterfront Revitalization Program;
- Evaluate wetlands for their capacity as local non-point source pollution control (stormwater) infrastructure to better inform relocation or mitigation actions; and,
- Incorporate BMPs from the *NYS Highway Superintendent Roads and Water Quality Handbook* into Tonawanda Highway Department's Policies.

CHERRY FARM

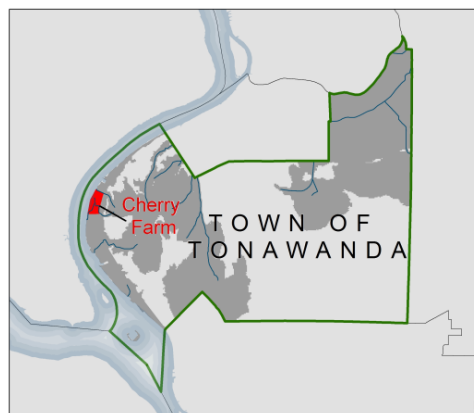
Municipality: Town of Tonawanda

Acreage: 56 acres

Location: River Road

Ownership: National Grid

Site Description: Cherry Farm, formerly known as Rattlesnake Island, was once one of the most productive wetlands on the Niagara River. The eastern channel around the island was filled to connect it to the main land to be used for farming and industrial waste disposal. The site is now a capped hazardous landfill that has experienced some grassland and aquatic habitat restoration. A variety of plans have been proposed for the site including installation of pavilions, a bandshell, boat launch, and storage facility; however, the landfill cap limits the type of land uses that can occur there. Cherry Farm's site maintenance plan recommends mowing once per year to control woody vegetation.



Conservation Strategy: Incorporate creation of native grassland meadows into remediation of landfills, brownfields, or other abandoned lands in the river corridor.

Proposed Action/Restoration Potential: The location of Cherry Farm within the Niagara River corridor presents great potential for creating a large expanse of valuable habitat for a variety of migratory birds, raptors, beneficial insect pollinators, and native fish. Its placement also allows for connectivity to areas where habitat restoration work has already occurred including the Niagara River island complex and East River Marsh upstream of the site. Enhancement of grassland, wetland, and aquatic habitats are recommended for providing productive habitat that won't compromise the integrity of the landfill cap. Connecting the loop that already exists around the parcel to the Riverwalk trail and providing educational signage would also be beneficial in order to increase public access and wildlife viewing at the site.

Grassland Habitat

Although the current grassland cap provides valuable habitat not found elsewhere along the River corridor, opportunity exists for further enhancement at Cherry Farm through the following activities:

- Reduce species like Crown Vetch (*Securigera varia*) and seed the landfill cap with selected grasses and forbs (i.e. native warm-season grasses); and,
- Adjust mowing practices to support the establishment and sustainability of a warm-season dominated grassland (e.g. mowing every two to three years; creating subunits across the site for sequencing mowing so that the entire grassland is not mowed at the same time).

Wetland Habitat

State classified wetlands exist along the eastern and northern boundaries of the parcel, which may be a partial remnant of the historic river channel (Map 4.52). Approximately 8 acres of wetland habitat are severely impacted by a dense invasion of Phragmites and some Black Alder:

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- Complete invasive plant control followed by phased introduction of native plants in all vegetation layers to improve the quality of wetland habitat at the site. Phragmites control should involve adaptive management using both mechanical cutting and chemical application, and should occur over multiple years. Monitoring and follow-up spot treatments are required.

Aquatic Habitat

Some habitat enhancement work along the shoreline has been completed by DEC between 2001 and 2005 including the installation of barrier islands that act as fish attraction structures and armored rock walls to prevent erosion (Map 4.52). The best opportunities for in-water habitat restoration and enhancement occur between the barrier islands and mainland, and nearshore areas. Enhancing shoreline habitat at the site provides for expanded restored aquatic connectivity to other sites that have undergone habitat improvements including the Niagara River island complex just upstream of the site:

- Modify hydraulic regime by strategically placing stone structures and enhancing riparian corridor form and function to create in-water habitat, oxygenate water, promote moderate thermal loading, and reduce stressors associated with low-flow stream conditions (i.e. adjust or reposition stone structures in areas with stagnant water, add additional stone piles, place submerged stone barriers or structures adjacent to nearshore areas). These types of features were successfully installed at Little Beaver Island as part of a Habitat Improvement Project. Specific suggestions on where these elements should be located at the site are included in Map 4.53;
- Improve hydrological connection from the river to the wetland channel at the north end of the site. This could be an opportunity to modify the wetland near the outfall for Northern Pike breeding habitat. More detailed analysis should be completed regarding the slope and wetland hydrology to determine the feasibility and best method for implementation;
- Plant within the backwater channels and more shallow areas near the shoreline to expand and create emergent wetlands;
- Fill the riprap shoreline and river bank with soil along the upstream extent of Cherry Farm shoreline, then seed and plant native species of high wildlife value for avian species and beneficial insect pollinators (Map 4.53); and,
- Install fish attraction structures along the shoreline, upstream of the middle barrier island (Map 4.53).

Potential Implementers/Partners: Town of Tonawanda, DEC, USACE

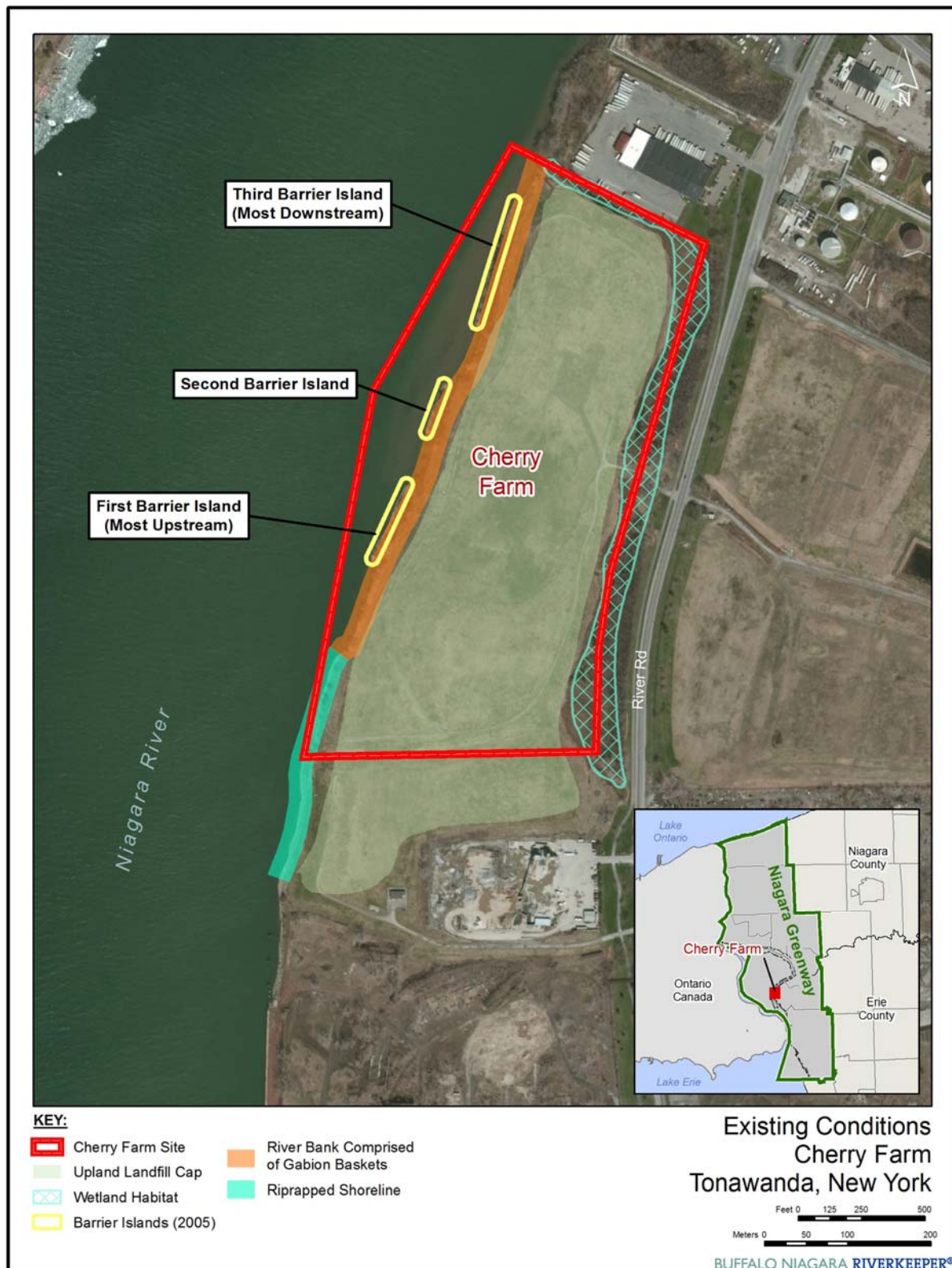
Potential Funding Sources: Freshwater Future Project Grant Program, NFWF Pulling Together, NYSDEC Brownfield Opportunity Areas Program Grants



View from the outside and inside of barrier islands along the Cherry Farm shoreline. Opportunities exist for in-water fish attraction structures and enhancement of both emergent and submerged plant species.

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Map 4.52 Cherry Farm: Existing Conditions



Map 4.53 Cherry Farm: Opportunities

