

## Chapter 3 Conservation Priorities and Recommended Actions

This chapter details the importance of landscape scale opportunities associated with each conservation strategy for the Greenway. By this, we mean those opportunities which span multiple municipalities, biodiversity features, or landscapes. Analysis of landscape scale conservation opportunities is important to overall Greenway connectivity.

For most strategies, more detailed information and recommendations are categorized by municipality and can be found in Chapter 4. For some, including the Niagara Gorge and Niagara River islands which are owned or managed by various state agencies, more detailed information and recommendations are included in this chapter.

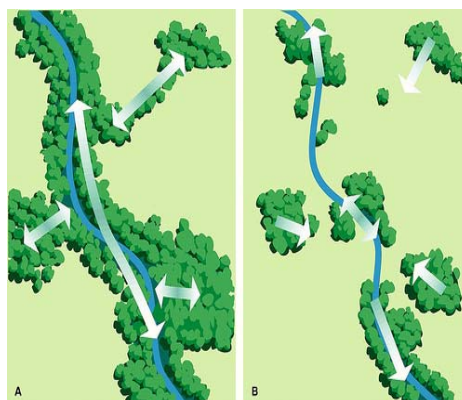
Several overarching issues were taken into consideration throughout the Strategy's planning process which are not explicitly referenced in the following conservation strategies. These include:

- **Climate change:** The use of the ARA model and many of the selected indicators, especially those related to size (such as buffer widths or acreages for forest or grassland habitat viability) are directly contemplative of climate change scenarios for the region. These potential scenarios include flashier streams, more extreme storm effects, and greater pressures from invasive species. It is important that habitat conservation and restoration within the Greenway and Niagara River Watershed work towards improving resiliency to mitigate potential impacts associated with climate change;
- **Invasive species:** Although invasive species are noted in regard to priority actions at specific sites within Chapter 4, landscape level actions associated with invasive species management within the region should include widespread monitoring and rapid response to the most critical infestations negatively affecting biodiversity. The Western New York Partnerships for Regional Invasive Species Management (PRISM) is leading this effort within the Greenway and should be used as a resource and clearinghouse for invasive species information;
- **Coastal zone management:** Strengthening of coastal zone management policies is an important element that is needed in order to better regulate and protect important natural areas as well as bridge the gap between local and state regulations. Maryland's Coastal Zone Management Program provides a model for how policies and programs could be structured to address this problem; and,
- **Impervious surface:** The amount of impervious surface within the Greenway project area is over 26%. This directly correlates with stream degradation, especially since highways border many of the major waterways. Municipalities in the region as a whole should consider a policy of no net increase in impervious surface. Where new roads are built, the old should be removed or greatly downsized. Parking space requirements should be revised as many were developed when the average car was much larger. Porous pavements and other green infrastructure designs need to be incorporated wherever possible to reduce runoff and other negative impacts of the impervious surface footprint. Ideally, impervious area should be below 10% of any drainage area.

**Strategy 1: 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 condition of riparian (or streamside) areas greatly affects the condition and quality of aquatic habitat. Where riparian buffers are present they provide important services that protect the integrity of the waterbody. Riparian buffers regulate inputs to the water by filtering runoff and reducing erosion, support plant and animal species, stabilize banks from collapse or incision, and provide cycling functions for minerals and nutrients (USEPA, 2012). A lack of riparian buffers and resulting erosion and sedimentation is one of the most critical threats to the health of aquatic habitat. Therefore, creating and expanding upon existing riparian habitat is a priority action within the Greenway.

In the context of coastal resiliency planning, connectivity between stream buffers and adjacent habitats like floodplains or riparian wetlands is important for preserving natural stream functions that benefit the entire aquatic system. When a waterbody is connected to an active floodplain, surface and subsurface storage of floodwaters reduces the power of flows, increasing stream stability and lessening potential damage to communities and infrastructure from flooding. Landscape level analysis for opportunities to utilize riparian buffers, wetlands, forest, and grassland tracts as components of a “living infrastructure” system can result in a mutually beneficial relationship protecting natural systems and community and economic assets.



**Figure 3.1 High (A) and low (B) degrees of connectivity. Connected landscapes have higher levels of functions than those that are fragmented (Smith et al., 2008).**

Further, preserving areas within the ARA can reduce a significant burden associated with repairing damages from flooding and erosion which cost the United States approximately \$6 billion per year (Smith, Schiff, Olivero, and MacBroom, 2008). Longer flow paths along adjacent habitats also allow for more time for infiltration to remove pollutants and recharge groundwater. This in turn ensures the protection and availability of ground and drinking water. Buffer areas also provide important travel corridors for terrestrial wildlife species and support the needs of a wider variety of species for foraging and refuge as opposed to narrow and disconnected riparian areas (Smith et al., 2008).

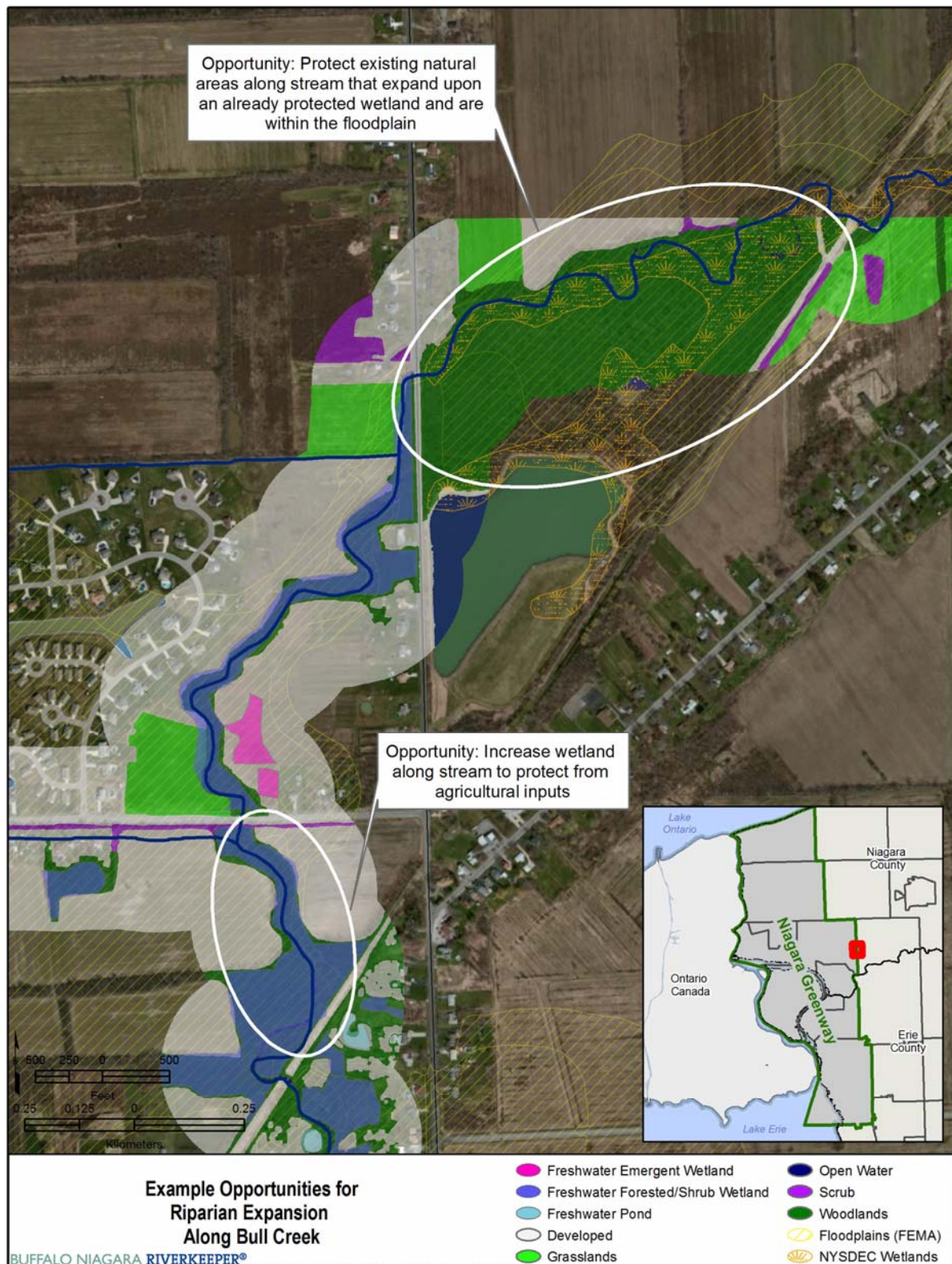
From a desktop standpoint, several tools are available to identify opportunities related to this strategy. LIDAR land cover analysis provides a detailed and current view of areas where gaps in buffers exist. Headwaters are a priority for investigation. Additional data like water quality sampling results and erosion assessments help to identify areas to focus efforts.

Map 3.1 depicts an example of how the data described above can be used to identify priority areas for expanding riparian habitat around the headwaters of Bull Creek in Wheatfield. For more on how municipal policies and regulations can protect and expand existing riparian habitat, see Chapter 4.

*\*Site-Specific Opportunity: West River Parkway (Section 4.8).*

# Niagara River Greenway Habitat Conservation Strategy

Map 3.1 Example Opportunity for Riparian Expansion





### Strategy 2: Reduce stream barriers in areas of known or probable interference with aquatic life.

Many migratory fish and other aquatic species found in the Niagara River require access to tributary habitat for some portion of their life cycle. Barriers along tributaries can block passage for species traveling up or downstream affecting species survival and genetic diversity due to lack of access to important habitat types. Barriers to fish movement were identified as a critical threat for aquatic habitat within the Greenway, with only 46% of tributary habitat free of barriers. Reducing the presence of barriers known to interfere with aquatic life is important in protecting native aquatic species in the Niagara River.



Vegetation barrier on Bergholtz Creek (BNR).

Barriers to fish along all perennial streams within the Greenway were identified and assessed (Map 3.2). Results from this assessment and discussions with the regional fishery experts determined that removal of barriers along Big Sixmile and Spicer Creek are priorities within the Greenway due in part to the high quality habitat that would become accessible. Detailed information and recommendations about these barriers can be found in Chapter 4.

Types of barriers include dams, culverts (any structure that allows water to flow under a road), dense vegetation, and even unfavorable stream conditions like areas of high velocity or low dissolved oxygen. Mitigation measures differ based on severity, ownership, and the species being targeted. Culverts, the most common type of barrier within the Greenway, may present conditions that are impassible to fish and other aquatic life when installed improperly. Municipalities and state entities are often responsible for culverts and have annual schedules for replacing them. Educating public works personnel about habitat friendly installation techniques, identifying high priority culverts for replacement, and working with community partners such as angler groups are all recommended methods for addressing barriers. Vegetation barriers are also common within the Greenway, often caused by development driven disturbances at road crossings and resulting in altered sediment deposition patterns and subsequent plant growth in ways which block or cause water to flow unnaturally. These barriers can be addressed through continual removal of vegetation and creation of a distinct low flow channel.

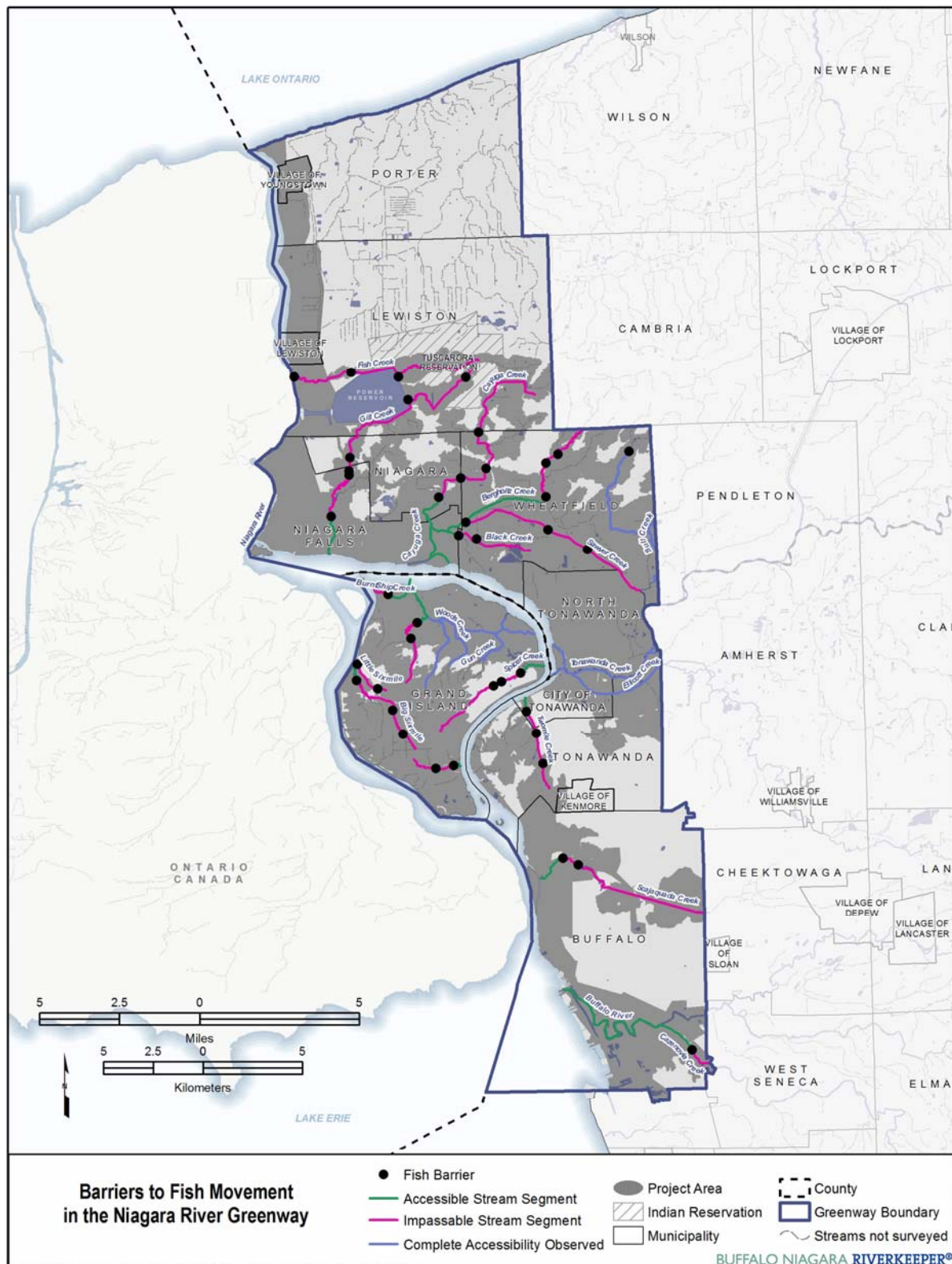


Perched culvert that presents impassible conditions due to height and low flow (BNR).

Discussions with regional fisheries experts led to the identification of Northern Pike as the target species for barrier removal within the Greenway. Although there is little documentation via literature, populations are believed to be at a depressed state due to a lack of access to spawning habitat. Adult Pike rely on the cold water of the river as hunting grounds along with wet meadows and wetland habitat for spawning and nursery grounds. Barriers and lack of wetlands along tributaries thus limit the long-term viability of Pike populations. Because Pike also have limited swimming and jumping ability, designing barrier solutions for this target species will benefit most other species within the system. A Strategy goal is to achieve passable conditions for aquatic life in a minimum of 75% of Greenway tributaries.

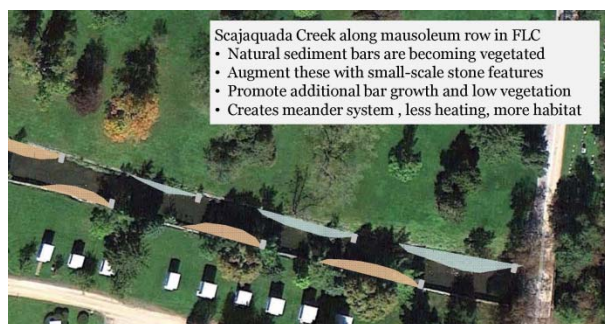
# Niagara River Greenway Habitat Conservation Strategy

Map 3.2 Fish Barriers within the Niagara River Greenway



### Strategy 3: Mitigate the effects of channelization and altered flows.

Throughout the Greenway channelization and altered flows are observed as a result of man-made manipulation of natural stream conditions. Many streams experience flooding and flashiness associated with the development and subsequent movement, narrowing, and straightening of streams. More severe alterations are observed in the water level fluctuations and flow reversals associated with activities from the State Power Authority and Erie Canal. These changes to natural hydrology may interfere with the life cycles of many species. Conservation measures may include stronger local and state laws preventing development in floodplains, requiring larger development setbacks and native vegetated buffer requirements, and encouraging soft engineering techniques to protect and restore living shorelines and their shallow water spawning, nesting, and nursery habitats.



Restoring natural meanders along Scajaquada Creek within Forest Lawn Cemetery would improve stream conditions including water quality and habitat for wildlife (USACE, 2013).

As stream channels are straightened, cut off from floodplains, and runoff from impervious surfaces increases, negative impacts result. Scajaquada Creek is one example. Major resources are now needed to develop and implement a plan that can un-do stream burial, channelization, sewer and stormwater overflows, and legacy pollution. Further alterations to streams within the Greenway should be avoided to preserve natural stream function. For Scajaquada Creek, restoration of natural meanders and the installation of living shorelines in opportune areas are a good start.

The Erie Canal channelization and flow reversal regime limits habitat connectivity between the Niagara River and Tonawanda Creek and has likely impaired aquatic biodiversity in both systems. From the Village of Pendleton to its mouth on the Niagara River, the creek is channelized and dredged to a width of 75 feet and a depth of 12 feet to accommodate the canal. From April through November, a lock diverts Lower Tonawanda Creek to flow backward approximately 19 miles northeast through the canal to Lockport. Flow reversals also affect water temperatures and may be responsible for periodic fish die-offs in the creek. The spread of invasives species within the canal, including the recent invasions of Hydrilla (*Hydrilla verticillata*) and Water Chestnut (*Eleocharis dulcis*), are likely related to the disturbance regime created by continuous flow reversals and boating activity. Conservation opportunities along the Erie Canal include outreach and education on restoring naturally vegetated buffers and shallow water habitat, and targeting high quality riparian areas for protection through zoning, acquisition, or conservation easements.

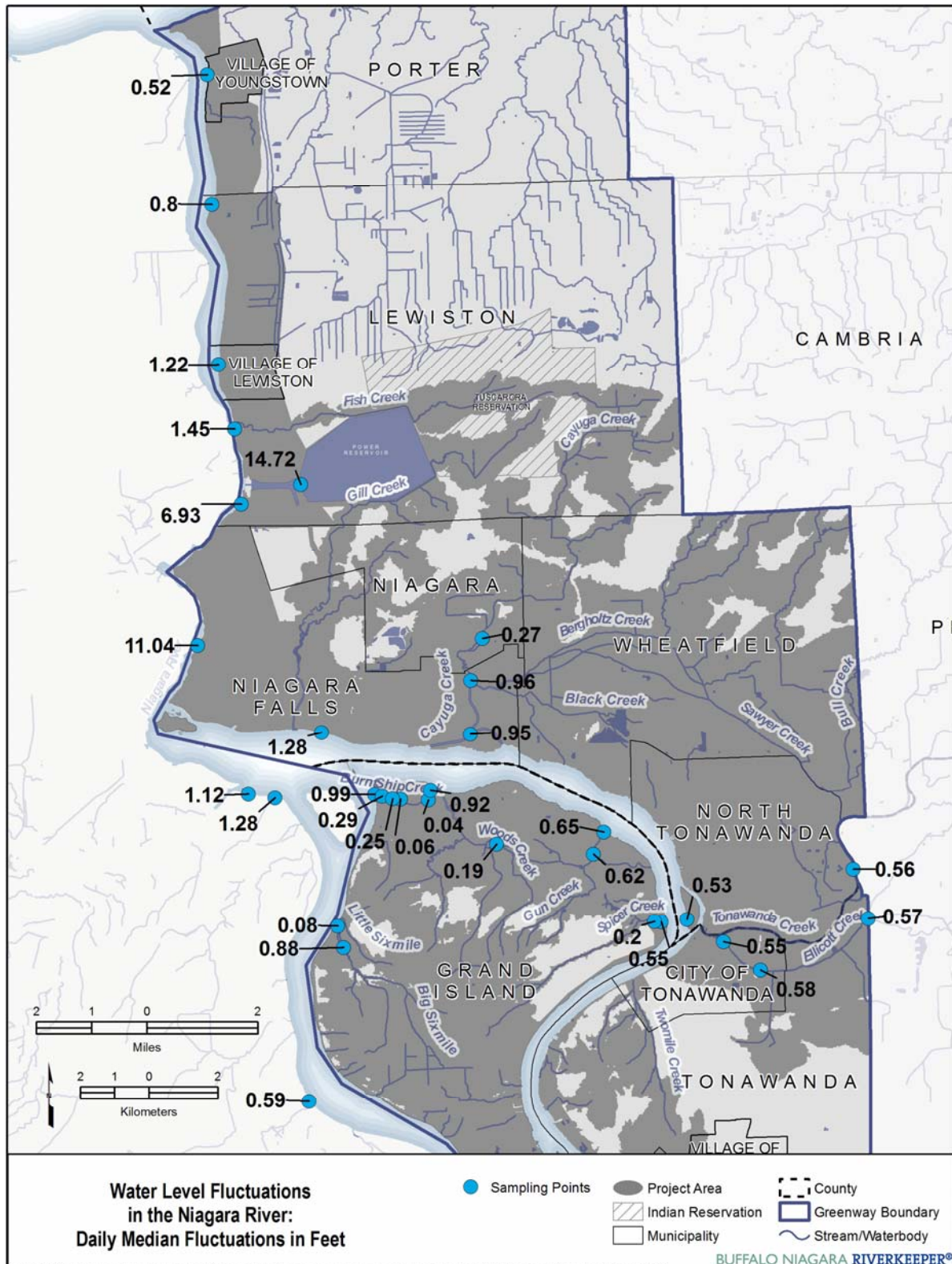
Water level fluctuations associated with New York Power Authority and Ontario hydropower operations is an overarching problem that affects a large portion of waterways within the Greenway. Water level drawdowns related to diversions for operation of the power plants average 1.5 feet a day just above the intakes, and up to 12 feet daily in the gorge (Map 3.3). One NYPA study identified 18 rare, threatened, and endangered species and communities that occur within the areas affected by fluctuations (Riveredge Associates, LLC., 2005). Research is needed on how to mitigate these effects, especially on breeding populations whose nests and young are vulnerable, and on how to restore natural flow conditions on highly modified rivers and streams within the Greenway.

*\*Site-Specific Opportunity: Weber Property (Section 4.2).*



# Niagara River Greenway Habitat Conservation Strategy

Map 3.3 Water Level Fluctuations in the Niagara River



### Strategy 4: Implement SVAP recommendations.

Through the Strategy, stream assessments were completed for 348 reaches (each reach 200 feet in length) on 12 Niagara River tributaries. These assessments provide in-depth recommendations for current opportunities to improve aquatic conditions along tributaries that will benefit all areas downstream. Recommendations describe riparian, channel, and in-water habitat improvements; invasive species priority areas; and best management practices for landowners along waterways. More detailed information is provided for streams within each Greenway municipality in Chapter 4.



### Strategy 5: Identify large and/or high quality wetlands for state designation and/or public acquisition.

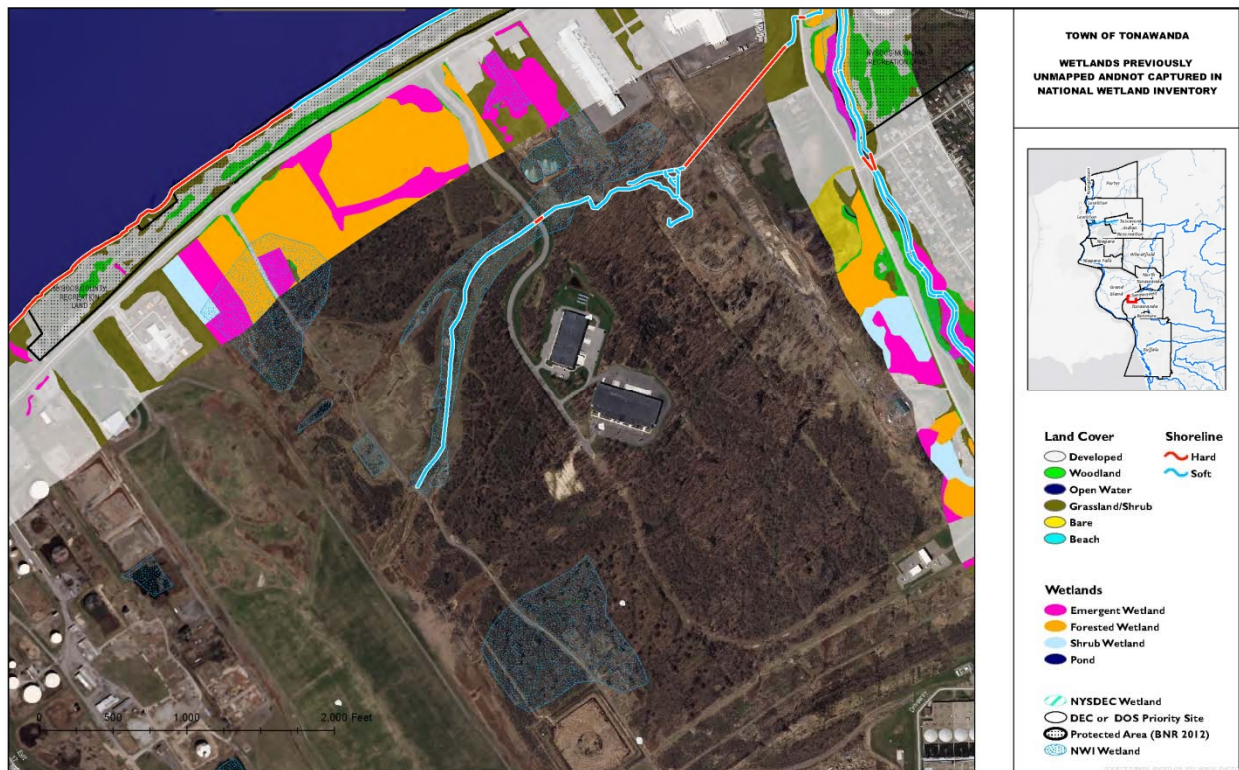
Within a landscape, the presence of wetlands is critical for providing services like carbon sequestration, filtration of pollutants and sediments, and flood attenuation. Wetlands are also one of the most productive fish and wildlife habitats and serve as valuable open space, especially in fast-developing areas where at times they are the only remaining natural lands (DEC, 2014). Lack of protection, lack of connectivity, and loss of acreage are among the most critical threats to wetland habitat within the Greenway. Through GIS analysis large areas of unprotected wetlands were identified, along with those areas that offer greatest connectivity potential to other already protected habitats. Applying protections to these areas will improve both the amount and quality of wetlands and the ecosystem services associated with their presence in a landscape.

Wetlands designated by the DEC currently have the highest level of protections associated with them. These wetlands must be at least 12.4 acres in size (unless of unusual importance). Currently only 29% of mapped wetlands within the Greenway are regulated by the state. GIS analysis was used to identify unprotected wetland areas that are 12.4 acres or larger within the Greenway using two separate datasets: NWI and LIDAR (Maps 3.4 and 3.5). NWI wetlands, mapped by the U.S. Fish and Wildlife Service (USFWS) using aerial imagery, are used to determine whether further review by the U.S. Army Corps of Engineers is needed for any proposed activities within the wetland area. LIDAR wetlands were also mapped using aerial imagery but on a finer scale (1-foot resolution) than NWI wetlands. Although this dataset only exists for a portion of the Greenway, it offers current and detailed data that aids in identification of on-the-ground opportunities, at times capturing wetlands that have not been previously identified in publically available datasets (Figure 3.2). The results from this analysis represent areas that could potentially be protected through state regulations and which may not have been previously mapped. Those wetlands that are adjacent to already protected wetlands are signified in each map, and represent priorities for action.

Municipalities and landowners can petition the DEC to consider regulatory status for any significant wetland (greater than 12.4 acres) under their jurisdiction. The NYS Comprehensive Wildlife Conservation Strategy emphasizes the need to pursue protection for wetlands of any size that provide habitat for species of herpetofauna of greatest conservation need (DEC, 2005). Protection of land is another tool that can be used to protect significant wetland areas. This can include the purchase of land (fee simple acquisition), removal or transfer of development rights, or implementation of a conservation easement (permanently limiting the use of land through a legal agreement most commonly between the landowner and a government agency or land trust). The New York State Open Space Plan contains statewide priorities that guide funding for land acquisition. The 2014 draft version of the plan identifies urban wetlands within the Niagara River Greenway as a priority for land acquisition, although current funding is insufficient (DEC, 2014).

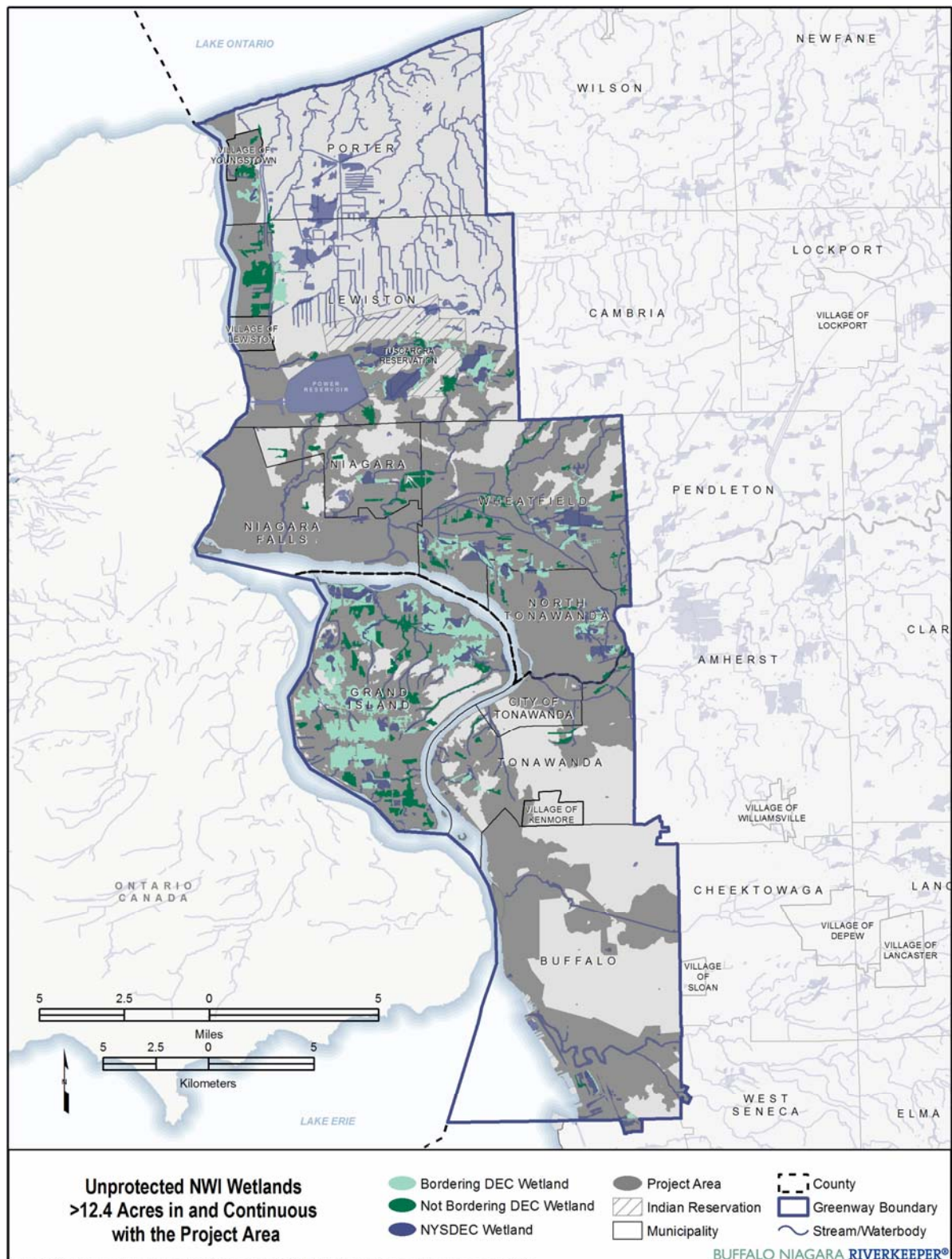
*\*Site-Specific Opportunity: Shawnee Wetland (Section 4.6).*

Figure 3.2 Previously Unmapped Wetlands Identified Through LIDAR



# Niagara River Greenway Habitat Conservation Strategy

Map 3.4 Unprotected Wetlands >12.4 Acres in and Continuous with the Project Area





**Map 3.5 Unprotected LIDAR Wetlands >12.4 Acres in and Continuous with the Project Area**



**Strategy 6: Work with public and private landowners on best management practices to gain maximum ecosystem and community values of wetlands including stormwater retention and filtration, native species diversity, and beauty.**

It is often difficult to relate ecosystem services to monetary values as some of the functions wetlands provide are not goods or products that can be bought or sold on the market. Locally, wetland conservation projects have resulted in considerable benefits to communities, as demonstrated by the West Seneca oxbow restoration project. This project, led by Buffalo Niagara Riverkeeper, restored 14 acres of a 30-acre wetland in the Town of West Seneca, enhancing the ecosystem services of stormwater containment and filtration, flood control, wildlife habitat, amenity-related property value, and carbon sequestration, as well as providing opportunities for recreation, education, and research. A joint Riverkeeper and Town of West Seneca effort attempted to demonstrate the richness that wetlands provide to the community through the application of traditional economic system valuation. The total dollar value of the ecosystem services for the town-owned portion of the oxbow is estimated as \$5.3 million in present value terms, while the dollar value of these services for the oxbow as a whole is estimated as \$12.5 million (Ecotrust, 2014).

Due to the fact that most wetlands are located on privately-owned lands, it is important that landowners are made aware that their property contains wetlands and that technical assistance related to protecting and improving habitat is available to them. Best Management Practices (BMPs) for wetlands include refraining from any activity that causes disturbance such as logging, draining, and ATV use. Programs like the Niagara River Riparian Restoration Program funded by the Greenway Ecological Standing Committee provide technical assistance and educational materials to shoreline landowners in regards to riparian wetland management. However, a wider outreach effort is needed to make an impact within the region. The most effective way for this to occur is to create a partnership between local organizations, agencies, and other groups that can combine resources to work towards a common goal in order to achieve greater knowledge of wetland benefits and management techniques (USEPA, 2010). New York State stormwater management policy also needs to provide guidelines to municipalities for quantifying and managing the benefits of standing green infrastructure, such as wetlands, in their required stormwater management plans. Opportunities exist to utilize creative approaches such as wetland mitigation banking and temporary flooding of agricultural lands during dormant planting periods to expand the extent of lands providing contiguous habitat and coastal resiliency benefits. However, to date, these approaches have not been adopted or maximized by federal, state, and local entities within the region.

Technical and monetary assistance is available to landowners through several state and federal initiatives including: Partners for Fish and Wildlife Program, Landowner Incentive Program, and the State Wildlife Grant Program. Tax breaks are also provided by the federal government for landowners that keep their land as open space or donate their land for conservation purposes. Municipalities can implement similar incentives (Strategy 13). The Niagara Region should look to neighboring states for program and policy solutions that provide successful models for conservation of natural features and can be easily replicated within the Greenway.

*\*Site-Specific Opportunity: Veteran's Memorial Park (Section 4.9).*

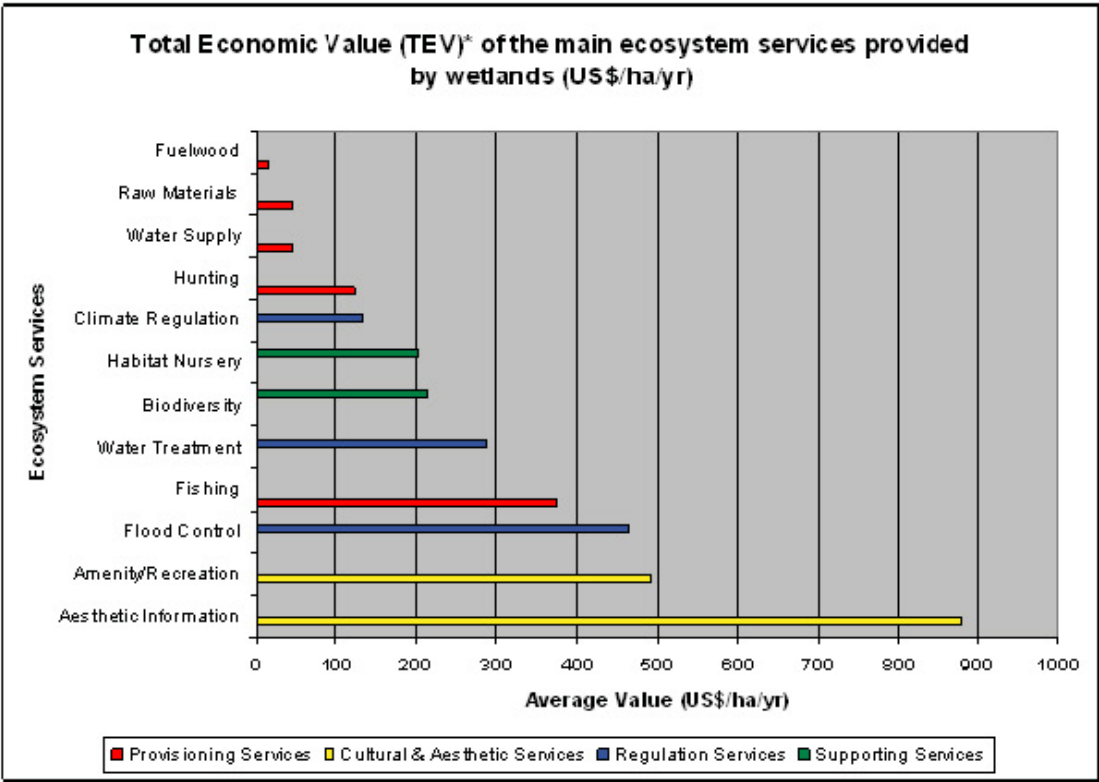


Figure 3.3 One example of wetlands valuation derived from 200 case studies. Overall total services are valued at \$3,274/ha/year; however, this does not include sediment control, spiritual values, and several other services, thus is an underestimation (De Groot et al., 2006).



**Strategy 7: Work with municipalities, land conservancies, and private owners to transform vulnerable woodlots into ecologically functional, resilient forests through protection and connection of existing lots.**

Lack of protection and connectivity were identified as the critical threats to woodlands within the Greenway. Many existing woodlots within the region are vulnerable to further degradation due to the fact that they are unprotected. As forests experience disturbances like fragmentation from roads and logging, their ability to provide critical or important ecosystem services is degraded. Loss of stream cover, decreased size of core forest areas, and increased edge habitat allowing colonization of invasive species all negatively impact ecosystem and community resilience. It is important that remaining woodlots within the Greenway are protected from future fragmentation, and that connectivity between them is enhanced through the application of local regulatory mechanisms and incentives (Strategy 13).

A desktop analysis was completed in order to identify forested areas that are at greatest risk of fragmentation due to development pressures (Map 3.6). The first step identifies “at-risk” forested areas that are unprotected, greater than 100 acres, and greater than 100 meters from a road. The next step aims to classify those lands at greatest risk for future development based on their proximity to developed lands (shown as “forested edge adjacent to development”). The results generally depict those areas that are a priority for protection from future development, and can be compared with critical headwater forests (Map 3.7) and large patches of woodlands (Map 2.5) to identify additional priorities. The presence of multiple individual lots within one area of contiguous habitat indicates that a municipal open space or conservation easement acquisition program may be the best strategy for protecting these areas (Figure 3.4).

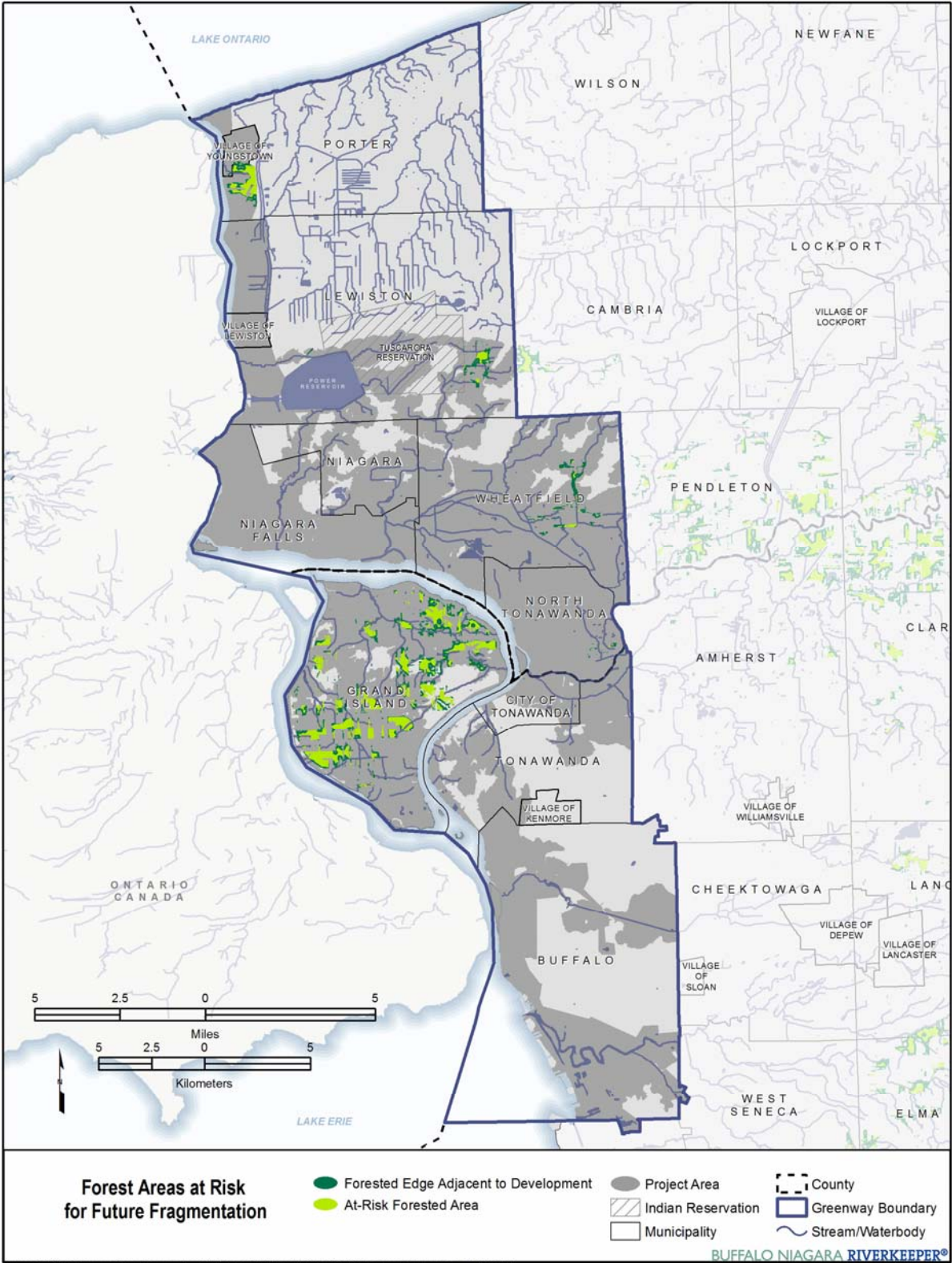


**Figure 3.4 Example of a priority forested area for protection that is dissected into many individual lots (located on the southwest portion of Grand Island).**

In addition to protecting forested lands, creating connections between them is an essential conservation strategy for the genetic diversity and long-term persistence of many species like amphibians and reptiles, especially in fragmented urban landscapes. Corridor width and length requirements vary by species. Nonetheless, generally (when considering only movement) a minimum of 50-100 meters is recommended (Environment Canada, 2013). Aerial imagery can be used to identify areas already in natural cover that connect large forested lands.

*\*Site-Specific Opportunities: North Tonawanda Audubon Nature Preserve (Section 4.4), Buffalo Ornithological Society Parcel (Section 4.8).*

Map 3.6 Forested Areas at Risk for Future Fragmentation

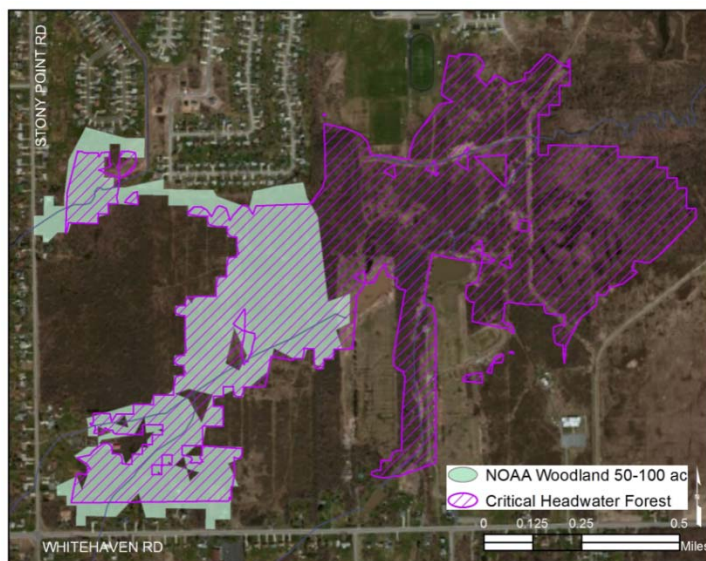


Sources: ESRI 2013, Niagara River Greenway Plan 2007, NHD 2008, NOAA 2005, BNRR 2014, Ecology & Environment Inc., 2012-2014.

**Strategy 8:** For public acquisition, prioritize escarpment and other headwater woodlands, remnant native communities, and parcels that will increase forest tract size to >100 acres.

A key objective regarding habitat within the Greenway is to preserve large patches of woodland required to support the long-term persistence of forests in the region, provide habitat to forest dwelling wildlife species, and offer resiliency to disturbances like extreme weather events and invasive species.

Recommended thresholds for forest tracts vary depending on species requirements; however, a study on forest interior dwelling species in Maryland recommends that generally woodlands be 100 acres or larger with 20 acres of forest interior (Jones et al., 2001).



**Figure 3.5** Example of an opportunity to expand a large area of woodland into surrounding headwater forest along Gun Creek (northwest portion of Grand Island).

Map 2.5 shows woodlands over 50 acres within the Greenway which are a priority for protection. Some of these forests include remnant native communities. Those patches over 50 acres are priority opportunities for expanding woodlots to surrounding natural areas in order to increase acreage, especially in areas with adjacent headwater forests like Grand Island (Figure 3.5). Challenges associated with protection of these areas include multiple landowners, a shortage of entities willing to hold title to land, and a lack of funding for acquisition and long-term stewardship. In addition to the creation of a dedicated funding source for protection of priority natural lands within the region, local entities including municipalities, agencies, land trusts, and other organizations should combine efforts and resources to overcome these challenges.

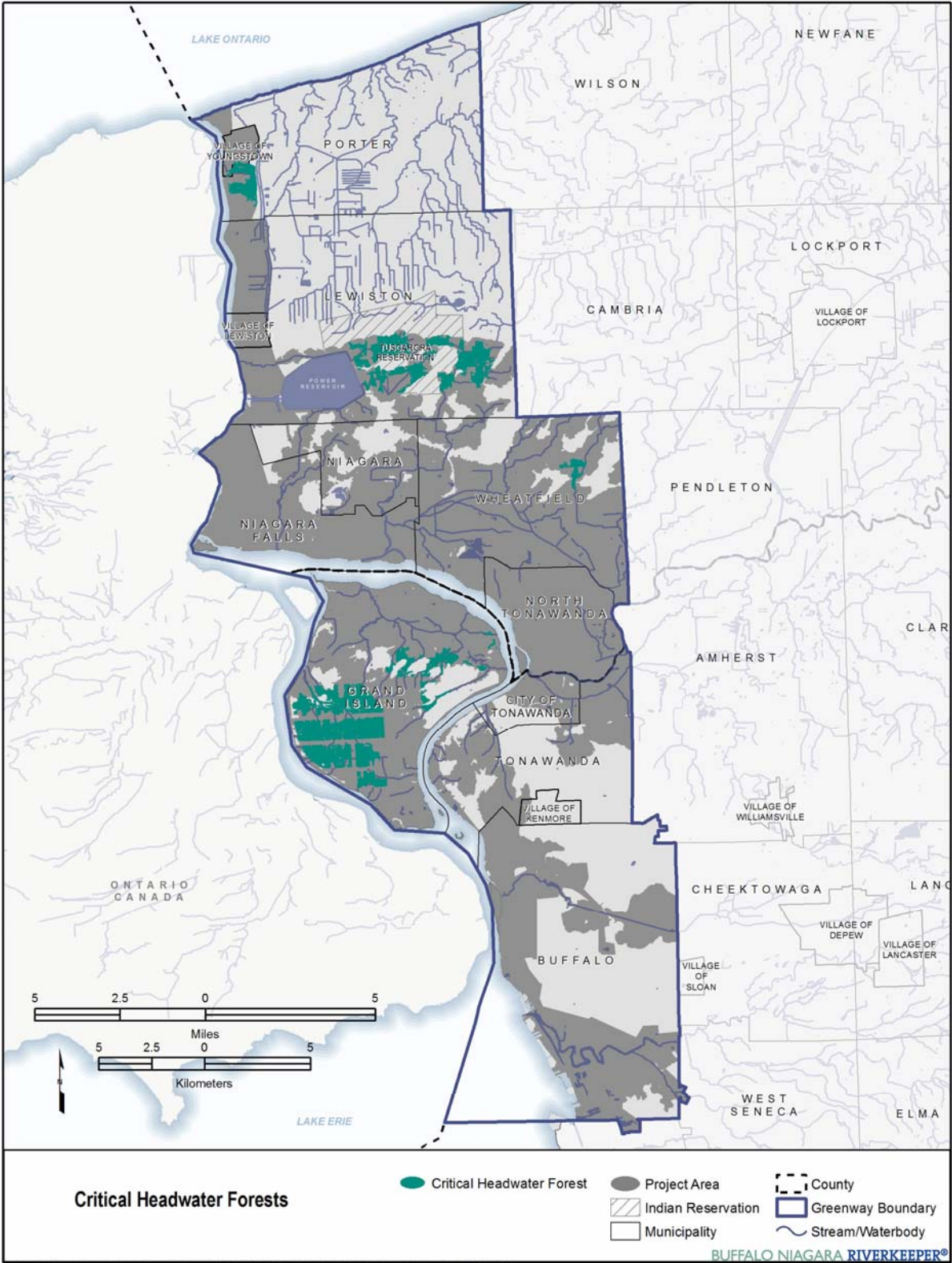
Critical headwater forests identified through GIS analysis using the Active River Area model are shown in Map 3.7. These areas are important because they contribute woody debris and nutrients to stream systems and have a direct role in shaping the form and function of the entire downstream system.

The Niagara Escarpment is a major geologic feature crossing the Greenway from the Niagara Gorge to Lockport. It 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).



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Map 3.7 Critical Headwater Forests



Sources: ESRI 2013, Niagara River Greenway Plan 2007, NHD 2008, NOAA 2005, BNRK 2014, Ecology & Environment Inc., 2012-2014.

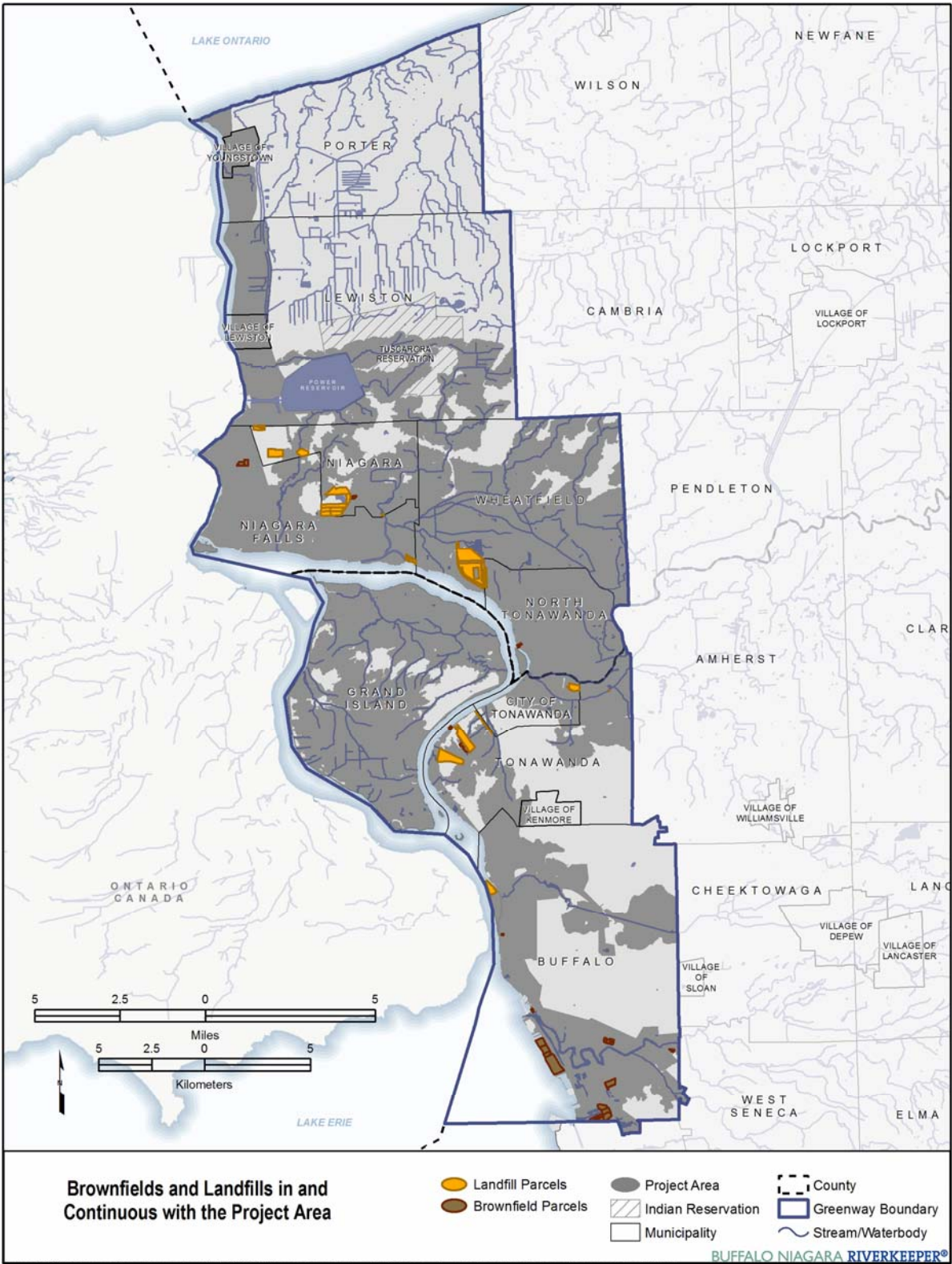
### Strategy 9: Incorporate creation of native grassland meadows into remediation of landfills, brownfields, or other abandoned lands in the river corridor.

A decline in grassland bird populations has been observed at a rate “faster than any other habitat species suite” in all of the northeastern US, including within New York State (Morgan and Burger, 2008). Although only 2% (1,785 acres) of the Greenway project area contains grasslands (NOAA 2010 land cover data), the existence of this habitat type within the region is of great importance for the species that rely on it. Studies of grassland birds conducted within the Western New York area have resulted in management implications whereby increasing areas of grasslands will have a positive effect on the productivity of breeding grassland birds and will also, “meet other important conservation goals, such as maintenance of open, attractive cultural landscapes, and regional biodiversity” (Norment et al., 2010 & 1999). Remediated landfills and brownfields represent an opportunity for creation of grassland habitat where uses on these lands are otherwise limited. However, even when intentionally designed to support grassland habitat and limited succession, capped landfill management plans are often lost or forgotten.

Selected brownfields and landfills representing the best opportunities for grassland conservation within the Greenway are shown in Map 3.8. They include areas like Cherry Farm, Gratwick Park, and the 102<sup>nd</sup> Street Landfill that have been capped with sufficient soil cover in select areas to allow for native grassland/meadow habitat recovery. It is important that the habitat plans for these remediated sites be fully implemented and enforced including monitoring and maintenance. Over-planting with a diversity of native plants, managing invasive species, and following a specific limited mowing regime are all important management actions for creating valuable grassland habitat. Mowing should only occur every two to three years and should avoid nesting seasons occurring between late April and mid-August (Morgan & Burger, 2008). Restoration actions should strive to satisfy habitat needs of listed grassland bird species within the region, especially those that are in decline (Table 2.8).

*\*Site-Specific Opportunity: Cherry Farm (Section 4.10).*

Map 3.8 Brownfields and Landfills in and Continuous with the Project Area



Sources: ESRI 2013; Niagara River Greenway Plan 2007; NYSDC 2008; Erie County Tax Parcels 2012; Niagara County Tax Parcels 2013; Ecology & Environment Inc, 2012-2014.



### Strategy 10: Educate landowners about best management practices associated with grasslands, especially on agricultural lands.

In addition to landfill management regimes, agricultural practices pose a considerable threat to the viability of grassland habitat for the region. Within the state, declines in grassland bird populations are strongly linked to the loss and abandonment of agricultural lands, along with the intensification of agricultural practices like frequent mowing, conversion to row crops, and loss of hedgerows (Morgan & Burger, 2008). Although agricultural lands are not prominent in the Greenway, 16% (13,293 acres) of the project area is classified as “pasture/hay” and “cultivated land” (2010 NOAA land cover data).

Grassland areas require careful management due to the fact that they revert to shrublands quickly, especially when invasive species like Honeysuckle (*Lonicera spp.*), Buckthorn (*Rhamnus cathartica*), and Multiflora Rose (*Rosa multiflora*) are present as they rapidly out-compete native species. A regular pattern of disturbance (i.e. mowing or grazing) is required (preferably every 2 to 3 years) in order to control succession; however, it is critical that disturbances are avoided during nesting season (generally late April to mid-August). Fall mowing should occur soon after the breeding season in order to ensure conditions that are dominated by grasses (Morgan & Burger, 2008).

Tools are available to provide education to landowners, which is the priority action necessary for creating and maintaining valuable habitat to declining grassland bird species. Local partners including DEC, Buffalo Ornithological Society, and Buffalo Audubon Society among others should work together to provide the technical assistance to properly manage grasslands.

The following documents are good examples of educational materials that can benefit grassland landowners:

- Ochterski, J. 2005. Cornell Cooperative Extension’s Guidelines for Landowners on Conserving Grassland Habitat. (<http://scnyat.cce.cornell.edu/grassland/>)
- National Audubon Society. Managing Habitat for Grassland Birds. (<http://ny.audubon.org/managing-habitat-grassland-birds>)
- Morgan, M. & Burger, M. 2008. Audubon New York’s Plan for Conserving Grassland Birds in New York: Final Report to the NYS DEC. (<http://ny.audubon.org/sites/default/files/documents/conservationplan-grasslandbirds-ny.pdf>)

Purchase of property or easements is another tool that can be used to preserve land containing grassland habitat if funds are available. Municipalities are able to partner with land trusts, like the Western New York Land Conservancy (WNYLC), to preserve valuable green spaces including agricultural lands. The Town of Clarence is a great example of how this partnership can work. In 2002, Clarence began their Greenprint Program, securing \$12.5 million through a bond act to protect open space. A little over 10 years later more than 1,300 acres have been protected and the town has observed a 15% increase in the value of properties adjacent to these areas while maintaining a tax rate 30% lower than surrounding communities (WNYLC – [wnylc.org](http://wnylc.org)).

### Strategy 11: Contribute to the creation of a Niagara River Greenway by protecting and connecting natural areas.

Although much work has been completed to enhance parks and trails, ample opportunity still exists to complete the vision of the Niagara River Greenway as “a necklace of open space and conservation areas.” Many areas along the waterfront are in transition like the Outer Harbor, providing a critical opportunity to protect functional as well as biodiversity values (Map 3.8). These are discussed in detail in Chapter 4 for each Greenway municipality.

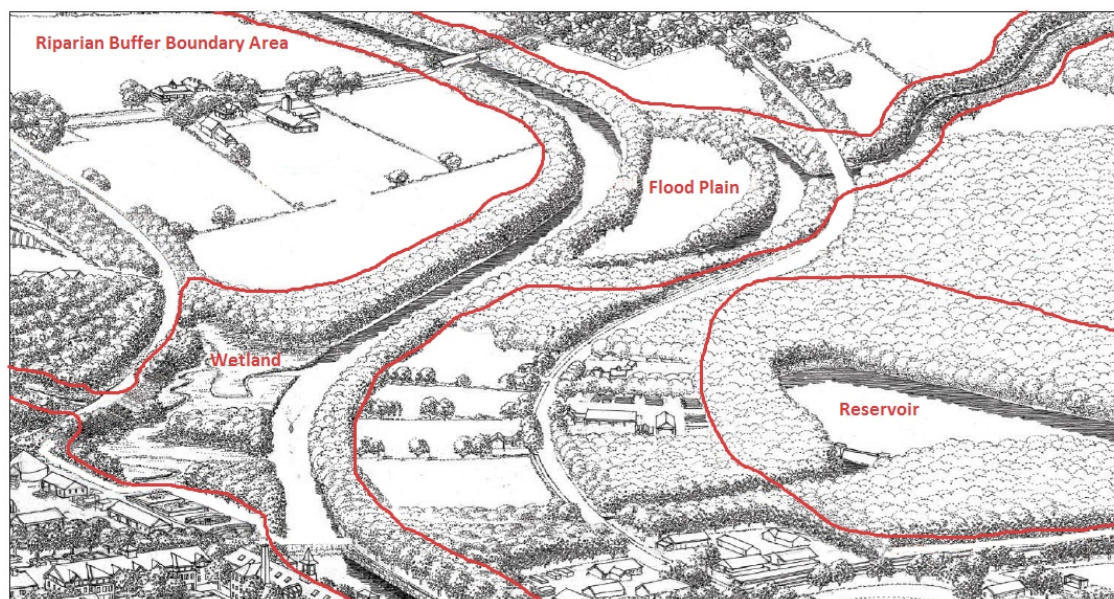
Several desktop analyses were completed in order to identify opportunities for protecting and connecting natural lands at a landscape scale within the Greenway. The first shows potential areas of natural lands that connect two semi-protected areas (Map 3.9). The linkages that were identified exist on non-residential lands (undeveloped, vacant, and publically owned) and when combined with the two areas being connected are a minimum of 25 acres in an attempt to achieve the minimum acreage desirable for ecological connectivity. The second analysis includes all natural lands regardless of protection status, and attempts to identify those areas that connect significant patches of woodlands (> 50 acres) and wetlands (Map 3.10). The recommendations under this strategy should be applied to all lands identified in this analysis.

In addition to those opportunities identified at a landscape level through desktop analysis, more in-depth evaluations should occur in order to pinpoint opportunistic options that would contribute to creation of a Greenway such as evaluating current private listings in close proximity to protected lands that could yield important expansions or connectivity projects.

*\*Site-Specific Opportunities: Outer Harbor (Section 4.7), Riverside Park (Section 4.6), Unity Island (Section 4.7).*

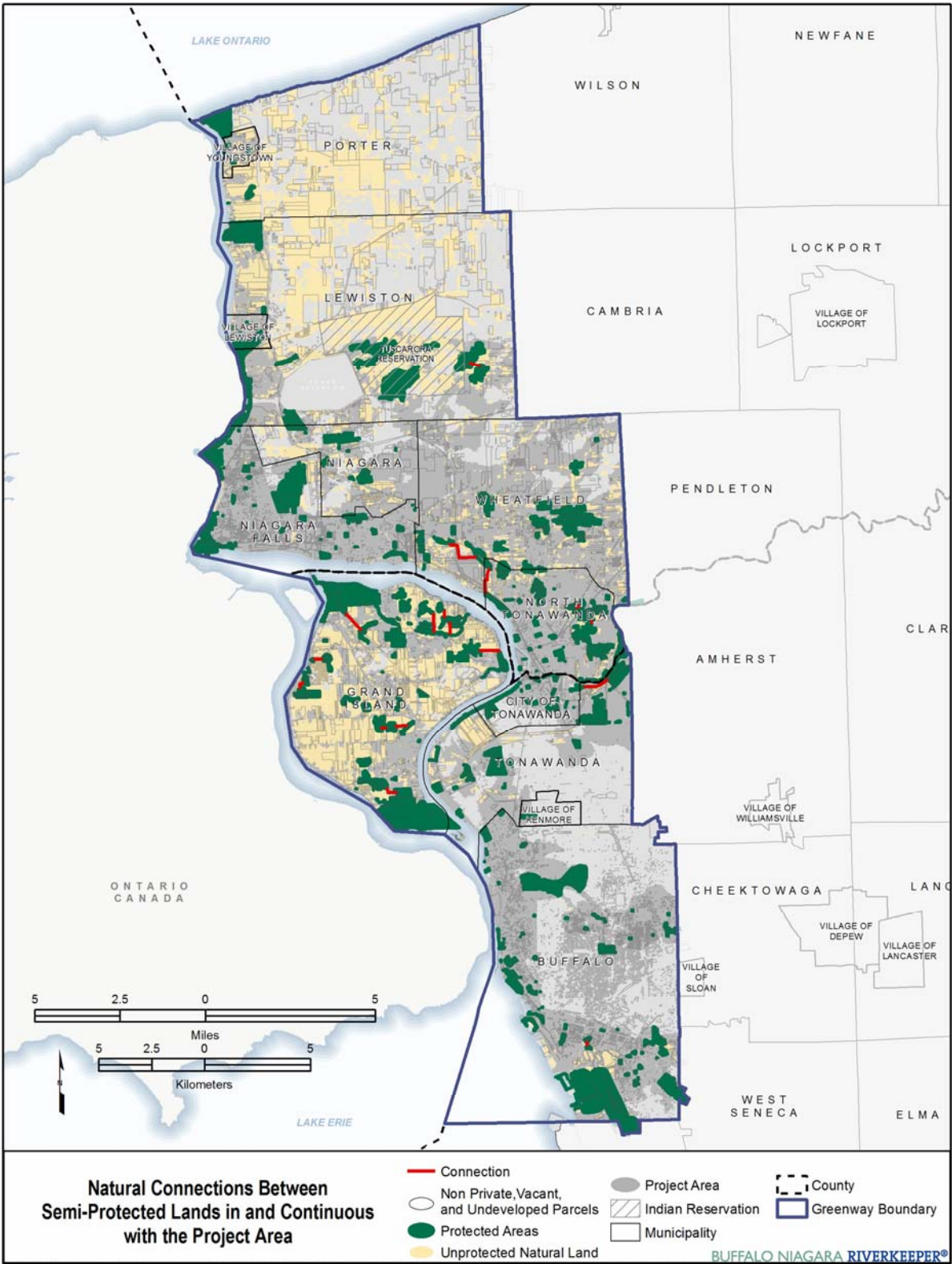
## Niagara River Greenway Habitat Conservation Strategy

Figure 3.6 An example of how living infrastructure can be connected in order to create a network that contributes to the vision of a Greenway (BNR).



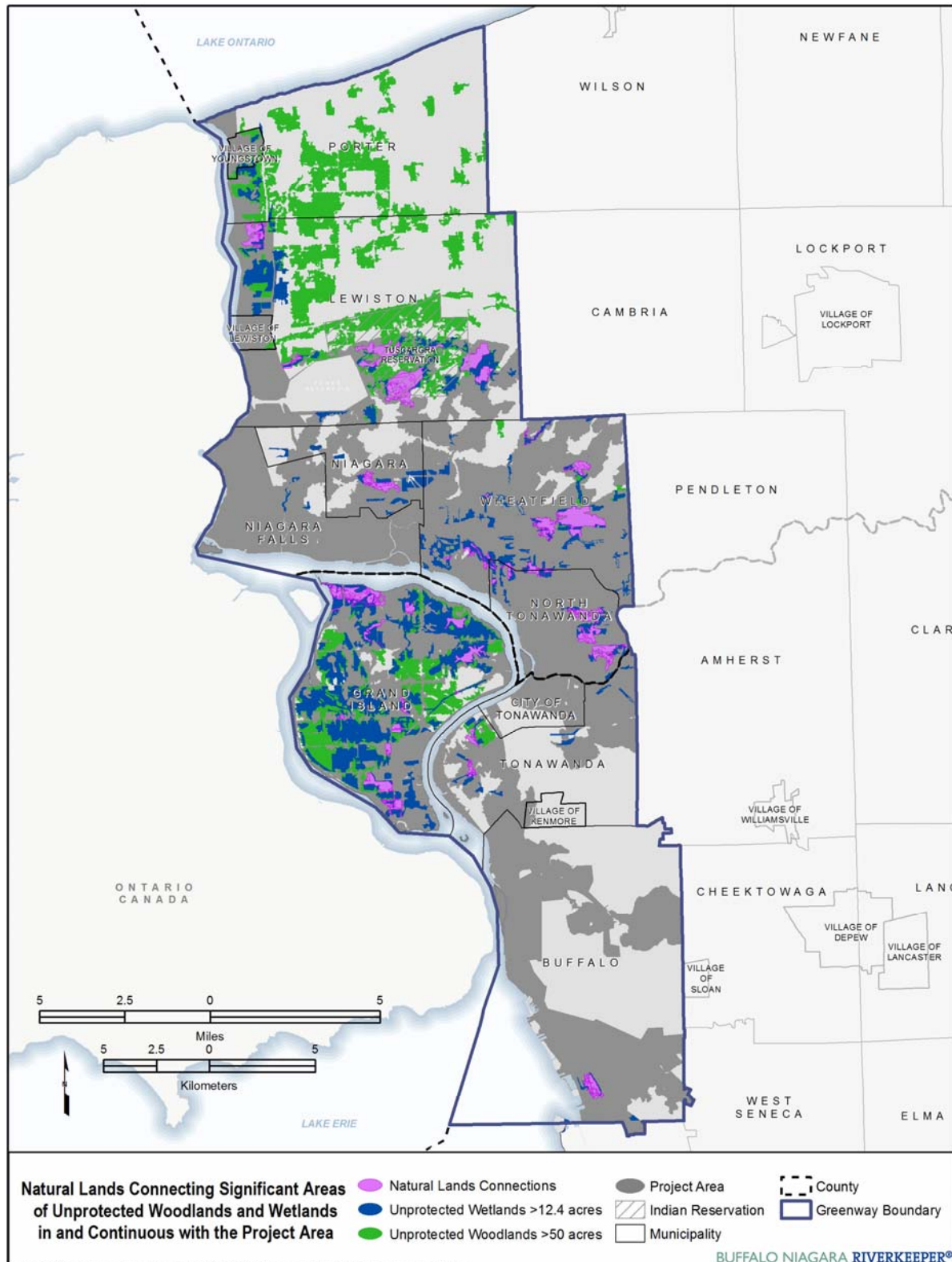


Map 3.9 Natural Connections Between Semi-Protected Lands in and Continuous with the Project Area



# Niagara River Greenway Habitat Conservation Strategy

**Map 3.10 Natural Lands Connecting Significant Areas of Unprotected Woodlands and Wetlands in and Continuous with the Project Area**



### Strategy 12: Increase habitat values of protected natural areas through improved management practices on public lands.

Improved management practices on public lands in the region would greatly benefit habitat quality. In many cases, public parks largely consist of mowed lawns and ball fields that offer little to no habitat or ecosystem service value. Recommended management actions include:

- Reduce mowing to only necessary areas;
- Remove invasive species and plant beneficial native species (i.e. pollinator plants);
- Implement naturally vegetated buffers around sensitive environmental features like waterways and wetlands in order to reduce erosion, provide valuable habitat, and improve water quality;
- Reduce, or have no net increase in impervious surfaces; and,
- Train highway departments in habitat BMPs including conservation of large woody debris in streams where possible.

By allowing these lands to return to their natural condition, wildlife habitat, recreational opportunities, and the quality of air and water all increase. In addition, costs for mower fuel and maintenance, fertilizers and chemicals, and staff hours spent mowing are greatly reduced.

*\*Site-Specific Opportunities: Oppenheim County Park (Section 4.6), Hyde Park Lake (Section 4.3).*



**Strategy 13: 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.**

Lack of protection is a critical threat to all habitat types within the Greenway. Development of land is a large contributor to the loss and degradation of habitat, and its impacts are often difficult to reverse. The Strategy's desktop analysis of impervious areas, land use cover types, and property class codes in the Greenway indicates those natural areas at greatest risk for future development (hotspots) and predicts future impervious surface area percentages (Map 3.10).

Local policy and regulatory tools are important for the protection and management of large or connected natural areas in the Greenway. For example, most municipalities within the Greenway have developed a Local Waterfront Revitalization Plan (LWRP) in order to protect and restore their coastal zones through New York State's Coastal Management Program. Locally adopted and state approved plans provide municipalities with a means to regulate government and private development within their identified waterfront areas.

Municipalities can also use regulatory tools like site plan and subdivision review, environmental overlays, and setback requirements to protect natural resources and stream corridors. Incentive based programs can be utilized along with regulatory tools in areas where redevelopment or revitalization is occurring to restore once lost natural features and habitat. The following are overarching recommendations for the Greenway. Chapter 4 provides more detail regarding what tools under this strategy are priorities for use in each municipality.

### Recommendations:

- **Inventory, map, and protect open spaces.** A current and detailed inventory of natural resources within a township is an important first step in implementing protections. Features that should be mapped include stream corridors, wetlands, floodplains, and significant patches of natural land. This will allow for easy review and understanding of the values that may be lost with proposed land use changes;
- **Amend local laws to regulate uses impacting important natural resources.** See the text box on the following page for a list of tools that municipalities can use to protect natural resources through regulatory language. It is important to ensure that these are incorporated into zoning codes or other regulatory documents and that enforcement of the specified protections occurs in order for these tools to be effective;
- **Establish a conservation easement program.** Conservation easements allow a municipality to acquire development rights on significant natural (or agricultural) features without acquiring the property outright, so that it remains in private ownership and stays on the tax rolls. Landowners also benefit from the application of easements on their property through income and property tax reductions. Grand Island and Clarence are two towns within the region that have adopted Conservation Easement Laws into their municipal ordinances and partner with WNYLC to define and monitor the limits on development;
- **Coordinate inter-municipal regulations and BMPs.** Some communities within the watershed have begun coordinating planning actions to foster stream corridor and open space preservation (see Regional Comprehensive Plan, 2010, Towns of Elma, Aurora, Holland, Wales, and the Village of East Aurora). These programs should be expanded within the urban core of the Greenway.

### Local Laws to Protect Natural Resources:

*Stream Vegetative Buffers & Development Setbacks:* Within zoning codes, municipalities can set thresholds for the amount of vegetation that should or must be maintained along any waterway. The City of Buffalo is an example of one community within the Greenway that has proposed a 100 foot development setback along the main portion of the Buffalo River for non-water dependent uses in their draft Green Code. Within that setback, the zoning code calls for a buffer of at least 50-feet planted in native vegetation.

*Site Plan Review:* This tool can be used to review the design and layout for proposed development on individual parcels. This allows the Planning Board to dictate where buildings and roads are placed, the design of stormwater management features, apply limits on lot coverage and landscaping features in order to have a minimal effect on existing natural resources. It is recommended that the site plan be reviewed by town Conservation Commissions (or equivalent group).

*Tree Ordinance:* The purpose of this ordinance is to provide regulatory guidance as to how a municipality manages their trees. In order to preserve the value of trees, it is recommended that the ordinance limit the amount and age of trees removed for development or other activities that require clearing, protect native trees along with those of significance, specify types and locations of trees for new landscaping, and require replacement of trees to be removed because of a hazard to the public or disease. Robust mitigation requirements should also be established for all approved tree removal so as to achieve no net loss in canopy coverage.

*Environmental Protection Overlay Districts:* Environmental Protection Overlay Districts are a type of zoning overlay that overlaps already established zoning districts to provide enhanced protections specific to the goals of the community for features like wetlands, wildlife corridors, riparian buffers, scenic view sheds, and other important habitats

*Incentive Zoning:* Incentive zoning creates a special ordinance or overlay area where incentives are offered to developers as a bonus for developing the property or area to meet certain goals. The incentives usually include elements to expand profitability for the developer, while also ensuring the community receives benefits as well. For example, incentives can include approving a higher number of lots, smaller lots, or a greater development density or building scales that would otherwise be approved in a given zoning district. In return, communities can request such things as common open space, affordable housing, special building features, or green infrastructure.

*Performance Standards:* Performance standards are a means of asking for an end goal or outcome during the development process while also leaving flexibility of how to achieve that goal up to the developer. Performance standards are usually dictated as a percentage for a developer to meet and are often used to address such things open space preservation, reduced building envelopes, retention of forest land, reduction of impervious cover, and on-site stormwater management. They can also serve as a means of guiding a certain type of development within a municipality, such as low-impact design, whose principles can lessen the impact of stormwater run-off into adjacent sensitive habitats.

*Strengthened Flood Ordinance:* Flooding is a growing concern in the Greenway as many communities are built out and past building practices have let development encroach into existing floodplains, contributing to flooding issues today. Many of the current flood ordinances in effect meet the minimums required by the Federal Emergency Management Agency's National Flood Insurance Program, which does allow for development in designated floodplains. There are several benefits from strengthening flood regulations to limit or eliminate development within floodplains, including those that benefit habitat.

- **Maximize the preservation of open space and natural features in subdivisions and other development.** Subdivision and development reviews often focus on what is being built rather than the environmental features of the site and how they are being altered. Applying conservation/cluster subdivision development town-wide, focusing development into hamlets or neighborhood centers, and phasing medium-large scale development approvals are all useful tools for protecting environmental features;

### Examples of Subdivision and Development Reviews:

Conservation subdivision or cluster development focuses development into clusters or dictates components of the property to preserve in order to retain open space, unique natural environments or other important habitats. Conservation subdivision takes regular subdivision one step further with the intent being to lessen a development's impact on the land and surrounding environment.

Comprehensive planning and zoning districts that focus on hamlet creation will allow a community to create new village clusters to focus more intense mixed use/residential development in appropriate locations. This Smart Growth development strategy can help to guide more intense development away from sensitive habitat areas within municipalities and lessen sprawling development pressures in open space areas.

Phasing medium to large scale development approvals (20-50+ unit subdivisions) over a long period of time (1-3 per 10-15 year period) can also reduce the pace of development. Phasing allows a community time to react if there are negative impacts to natural resources or public infrastructure, of which sometimes can take years to see the effects. Orchard Park is one municipality within the watershed that has adopted this tool.

- **Retain agricultural and forested areas and reclaim underutilized urban lands to protect and restore habitat.** Municipalities can support active farms and forests that employ environmental Best Management Practices with Tax Value Assessment Programs and other programs. Special taxing districts reduce the tax rate on portions of a property utilized for certain land uses or preservation of natural features. The incentive also benefits municipalities through a reduction in infrastructure and other service costs associated with these land uses, as well as counteracting the incentive to sell since removing a property from the program usually involves paying all the back discounted taxes that were waived.

For many of the urban areas in Greenway there are opportunities to recapture vacant or underutilized land as a means to restore habitat, especially along rivers and streams. The loss of industry in the region has left many areas along waterways vacant. With the right incentive programs and regulatory requirements, Greenway communities can promote recreation, wildlife corridors, shoreline marshes, trails, and other redevelopment features that require a portion of the property to include habitat restoration. Special Taxing Districts, Brownfield Clean-up Programs, and Low or Zero-Interest Loan Programs are just some of the tools that can be used to reclaim urban land for ecological benefit; and,

- **Use “Soft Engineering” (e.g. grading, terracing, vegetated buffers) vs “Hard Engineering” (riprap, sheet pile, and channelization) to control erosion.** As observed in many cases within the Greenway, shoreline areas experiencing erosion have been addressed with the application of riprap (large rocks and boulders), bulkheads, and concrete retaining walls. These methods not only

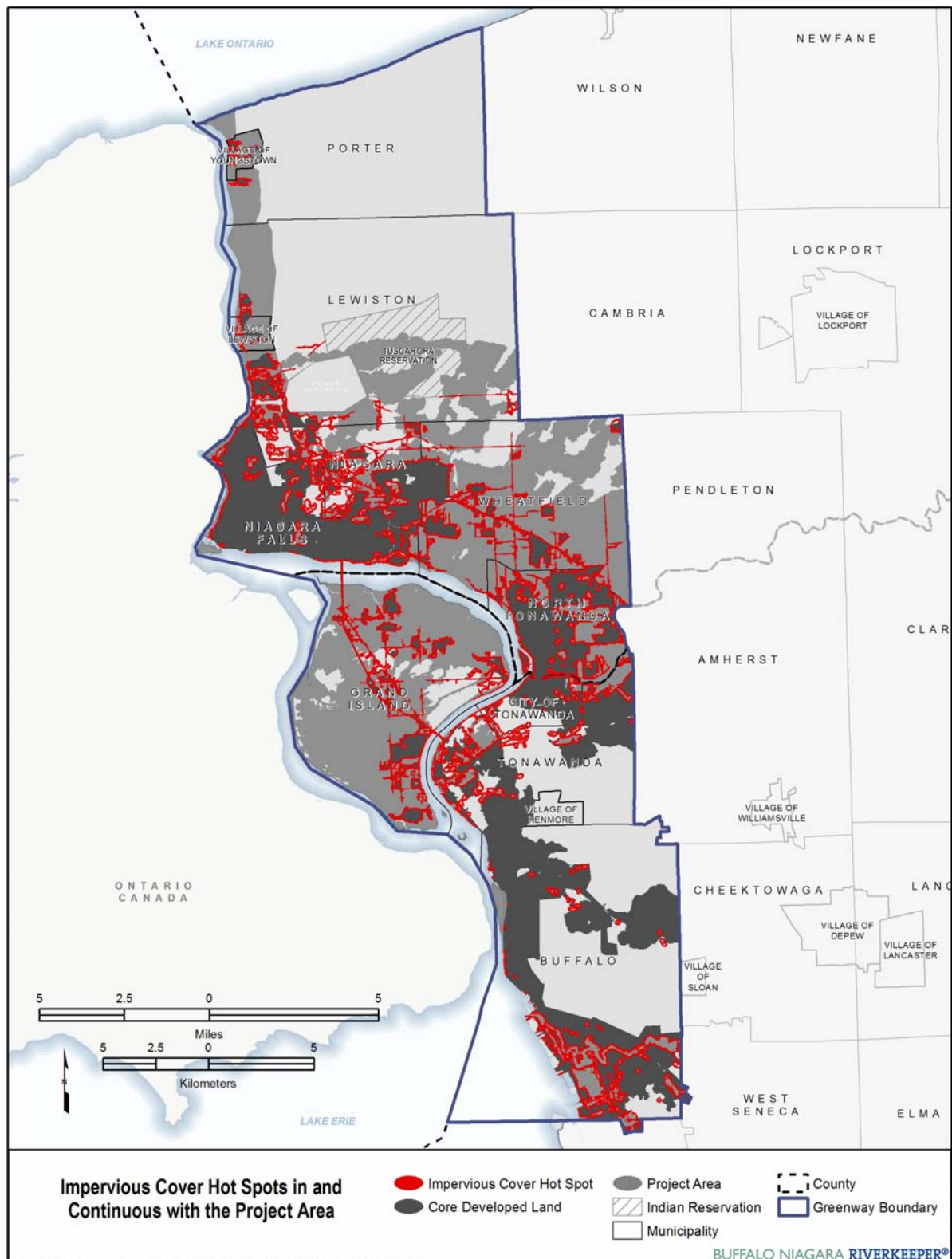


degrade the natural character of the shoreline, they often increase flooding and flow to downstream areas, increase pollution entering the waterbody, and are costly. Within the upper river, 83% of shorelines were identified as being hardened, with 24% of all shorelines within the Greenway containing hardened structures (Table 2.1).

In order to address this problem, soft engineering of eroding shorelines is recommended where conditions are appropriate. Ensuring that slopes are gentle and vegetation is plentiful will help reduce erosion while maintaining the benefits associated with natural riparian buffers. Where needed, root wads, logs, vegetative mats, and other elements that are natural and biodegradable can be applied to assist in improving stabilization. Through the Strategy, shoreline condition throughout the Greenway was classified using aerial imagery. This dataset (located in the Technical Report) can be used to identify priority areas for implementation of soft engineering techniques. Implementation of pilot shoreline restoration projects throughout the Greenway will take place over the next several years through the Niagara River Riparian Restoration Program, and will serve as a model for the best techniques for creating living shorelines. Additionally, model programs in neighboring states can provide tools to permit reviewers in evaluating whether a site is appropriate for a living or soft shoreline technique. Adoption of such guidance tools would foster a collaborative approach to shoreline protection where municipalities, community members and state and federal regulators work in unison to develop a mutually beneficial shoreline stabilization or restoration plan.

# Niagara River Greenway Habitat Conservation Strategy

Map 3.11 Impervious Cover Hot Spots in and Continuous with the Project Area



Strategy 14: A primary management goal for the Niagara Gorge is to identify, characterize, protect, and restore areas containing or supporting listed plant species and communities.

Due to its unique geologic and hydrologic conditions, the Niagara Gorge contains a number of listed plant species and communities, including a few that occur nowhere else in New York State. Some rare species such as Elk Sedge and Lesser Fringed Gentian are associated with groundwater seeps and discharges at various locations in the fractured bedrock of the gorge face. Over the summer-early fall of 2014, E & E conducted a survey of several groundwater seeps based on hydrology, geology, vegetation, and soils and substrates. Results, documented in *Initial Efforts for Characterizing Seep Habitats within a Selected Portion of the Niagara Gorge Trail System* (2015), indicate that although the hydrology and physical characteristics are largely intact, invasive species—including Purple Loosestrife (*Lythrum salicaria*) and Phragmites (*Phragmites australis*) – are an increasing threat to native plant communities, especially RTE species that occur on moist ledges and on the saturated slopes below major seeps. Expansion of these invasives has been observed since initial data collection in 2008.



Discharge from fractured sandstone near the gorge

Results from the seep study noted the presence and extent of biotic and abiotic stressors for those areas surveyed. In addition to invasive species, disturbances that may affect species within seep areas include varying degrees of hydration, bench or ledge collapse, and rock fall. Groundwater quality is also subject to land use, road drainage, and other forms of landscape development along the gorge rim and inland. Additional information is needed to fully characterize the quality and function of this gorge attribute (E & E, 2015).

A Niagara Power Plant relicensing study, *Effects of Land Management Practices on Aquatic and Terrestrial Habitats*, concludes that NYPA's vegetation management (mowing, herbicides, landscaping with non-native species) and road maintenance (road salt and other pollutant runoff) may have negative effects on habitat, but suggests no action, maintaining that these practices are widespread throughout the Niagara Region (E/PRO Engineering and Environmental Consulting, LLC., 2005).

### Recommendations:

- Identify and conserve the remaining native gorge plants and rare plant communities such as the remnant oak savannah rim community near Devil's Hole, the White Cedars throughout the gorge and the other rare plants associated with unique microclimate conditions;
- Reduce human impacts by ensuring that recreational areas and pathways are diverted away from sensitive native plant communities;
- Reduce the need for mowing, chemical herbicides, non-native plant materials, and paved surfaces to the greatest extent possible in the gorge area;
- Continue surveys of groundwater seeps to better understand current conditions and identify priority actions and locations for protection efforts. Investigate and address potential



## Niagara River Greenway Habitat Conservation Strategy

groundwater contamination from road drainage, landfill leachate, or other hydraulically connected land uses; and,

- Develop a management plan to remove invasive plants, including ornamentals, from the gorge over time and replace with locally-derived native plants where possible. Include protocols for collecting indigenous plant matter, such as seeds, other propagules, cuttings, etc., to ensure that restoration includes the genetic continuity of native populations in the Niagara area.

**Strategy 15: Remove roads, infrastructure, and incompatible uses from the gorge rim and river to the greatest extent possible.**

The future of the six-mile gorge portion of the Robert Moses Parkway (RMP) has been studied and debated for over a decade. Although the RMP has provided a limited access route through state parks along the gorge rim between Niagara Falls and Lewiston, it has also been found to be a barrier between the river and inland communities, including the City of Niagara Falls. Currently the gorge portion is half closed, little used, and greatly deteriorated. It also contributes to the overabundance of impervious surface in the Niagara River sub-basin, which is about 27% impervious, contributing to severe impairment to aquatic life in local waterways ([www.cwp.org](http://www.cwp.org)).

Because of these conditions, one study—*Regional Economic Growth Through Ecological Restoration of the Niagara Gorge Rim* (EDR, 2011)—set out to explore the potential benefits of gorge parkway removal. The EDR study shows what ecological restoration of the gorge rim might look like, including re-connected fragmented habitats like Whirlpool State Park and DeVeaux Woods, and an uninterrupted scenic trail, potentially the premiere segment of the lake-to-lake Niagara River Greenway (Figure 3.7).



**Figure 3.7 Concept for re-connection of DeVeaux and Whirlpool State Parks (EDR, 2011).**

## Niagara River Greenway Habitat Conservation Strategy

The EDR study demonstrates that the construction costs for removal and preliminary habitat restoration along the gorge rim would be far less than the costs of repairing and maintaining the gorge parkway. It also begins to quantify the economic gains to the City of Niagara Falls based on traffic access restored to local venues and an international scenic attraction extended six miles, promoting longer stays and ecotourism within the Greenway.

In terms of incompatible river use, New York State's Comprehensive Wildlife Conservation Strategy notes that excessive disturbance by watercraft is detrimental to habitats critical to Niagara River species—including fish, amphibians, reptiles, and aquatic invertebrates that support the lake and river food web (DEC, 2005). A relatively new attraction that now dominates the river portion of the gorge during tourist season is the jet boat industry. Up to 30 jet boats per day take passengers from the lower river up to the Whirlpool Rapids and back. Their noise, wakes, and erosive effects are exacerbated by the narrow confines of the gorge. Erosion of the soft, friable Queenston Shale is visible at the base of the gorge along with siltation of spawning habitat for many native species including Lake Sturgeon. Since the shoreline area of the gorge is already stressed by high daily water level fluctuations from power plant operations, the additional impact of jet boat disturbance on coastal habitat should be carefully evaluated.

Botanist Pat Eckel observed the impact of jet boats on a state-listed species: Ohio Goldenrod. "The year after I found this plant there . . . (the) jet boat concession roared past me at (possibly) 20 minute intervals creating a wake to either Canadian or American shores, knocking me about in the water... but most unfortunate of all, the station of this long-forgotten plant had collapsed into the churning water ... For the sake of this Goldenrod's future in New York State, exposed to damage by a commercial venue such as the jet boat, it is important to speculate on the impacts of [this] shoreline turbulence" (Eckel, 2008).

### Recommendations:

- Expedite the planning process concerning the fate of the gorge section of the Robert Moses Parkway, ensuring that the ecological and economic findings of the EDR study are fully included; and,
- Fund an independent scientific study to identify, evaluate, and address as necessary the impacts of jet boat use in the gorge, including impacts on river and shoreline habitat, rates of erosion and siltation, and effects on vulnerable plant and animal species.



Strategy 16: Use wetland, park, or other designation to limit human disturbance of island habitats and develop management plans that protect fish and wildlife habitat values.

A trend of loss in island habitat has been experienced within the Niagara River with current island habitat estimated at only 56% of acreages reported historically (Table 2.9). Although most are in public ownership and are considered to be semi-protected, islands and their surrounding shallow water habitats are vulnerable to disturbances like powerboat wakes and noise, anchoring, and mooring. These activities are not restricted although they take place within sensitive spawning areas and during nesting and fledgling seasons. Such disturbances affect not only the quality of habitat but also the economy in terms of the region's attractiveness to anglers, birders, and nature viewers.



Boats moored around Grass Island (courtesy Paul Leuchner).

### Recommendations:

- Limit human disturbance to the Department of State-designated “Significant Coastal Habitat” made up of the Strawberry, Frog, and Motor Island group and surrounding 400-acre shallow water habitat. This could be done through petition to a regulatory agency like the DEC to delineate and protect this area as a state-regulated freshwater wetland, or to a federal agency such as NOAA to declare this complex a marine sanctuary. Protection of the heron colony, Bald Eagle and Osprey nests and vegetated fish spawning and nursery shallows could include buoys limiting motorized boat traffic (see the Detroit River Wyandotte National Wildlife Refuge), and partnering with angler or other wildlife groups for monitoring;
- Ensure long-term monitoring and management plans and capacity are in place for island HIPs. For example, island and breakwall habitats and the breeding bird species using them are extremely vulnerable to damages from weather, predators, and loss of habitat viability and therefore may need to be repaired or replaced beyond the scope of management covered through the HIPs; and,
- Continue funding research on the viability and habitat needs of island/shallows-dependent species, including freshwater mussels, state-listed fish and herpetofauna, and IBA bird populations.

### Strategy 17: Provide support to delist habitat-related impairments in the Niagara River AOC.

Fish and wildlife habitat within the Niagara River has experienced significant loss and degradation over time as a result of a variety of physical disturbances. Loss of habitat is recognized as Beneficial Use Impairment (BUI) #14 in the Niagara River Remedial Action Plan (RAP). Amending the current criteria for delisting BUI #14 was identified as a need by the DEC's Remedial Action Committee and a Loss of Habitat Working Group was formed to complete this task.

Through the Strategy, Riverkeeper assisted with this task using the CAP process to help prioritize sites for habitat restoration including coastal wetlands and tributary and shoreline habitat. The top 10 sites and recommendations that emerged from this process are:

- Niagara River islands and shallow water habitat including Strawberry, Motor, Frog, and Grass (Sunken) Islands: Protect from human disturbances;
- Area south of East River Marsh: Enhance existing nearshore habitat and protect with berms;
- Cherry Farm: Improve hydrological connection to the river, manage Phragmites in wetland area, and enhance vegetation along riprap walls;
- West River Parkway: Enhance existing and create new areas of coastal wetland shoreline habitat;
- Outer Harbor: Complete plantings along riprap walls and create shallow water habitat;
- Outer Harbor: Connect and protect natural areas (see pages 183-190);
- Spicer Creek: Restore fish passage along tributary;
- Big Sixmile Creek: Restore fish passage along tributary;
- Mouth of Burnt Ship Creek: Provide shallow water and emergent habitat similar to Frog Island; and,
- Conserve and restore Lake Sturgeon habitat: Results from current research being conducted by USFWS will inform the specific areas and restoration needs associated with providing Lake Sturgeon habitat.

These projects along with the completion of eight HIPs implemented by NYPA as a part of their relicensing conditions could be used as the criteria for delisting of BUI #14. The cost and feasibility of these projects must be investigated before moving forward with their completion. The long-term maintenance and protection of habitat work completed through the RAP is necessary to create permanent improvement and should extend beyond the timeframe of the RAP. Islands and shallow water habitat (Map 2.8) within the Niagara River especially must be conserved for their significant habitat values to ensure that all other RAP restoration projects result in a net gain for Niagara River fish and wildlife species (see Strategy 16).

