



# CHAPTER 8:

## *Implementation Strategies*

This chapter describes potential strategies for implementing creek revitalization objectives. Four types of strategies are included:

**find revitalization opportunities in existing land use patterns;**

**establish design, sustainability and ecological standards to follow for future projects;**

**explore intermunicipal agreements as a multi-jurisdictional watershed policy approach;**

**and finally, seek sources of funding.**

The Onondaga Creek Conceptual Revitalization Plan (OCRCP), provides potential options for local communities regarding land use and best management practices. This chapter is a presentation of strategies in use elsewhere or in some cases, already practiced in the Onondaga Creek watershed. Each strategy has limitations; no single option is appropriate for the entire watershed. Strategies suggested are purposely kept broad, as many require cooperation with both urban and rural private landowners. Every step forward in creek revitalization must accommodate as many stakeholders as possible and strategically advance shared goals for Onondaga Creek. To accomplish revitalization work that makes the most sense for Onondaga Creek, all strategies require continued community dialog, public participation in implementation, and collaboration among organizations.

# Opportunities in Existing Land Use Patterns

## Rural Strategies

Strategies for both rural and urban creek revitalization are described in this section. In the case of the rural portion of the Onondaga Creek watershed, revitalization efforts may translate into protective measures: to maintain water quality, riparian areas, wildlife habitat, and scenic vistas and features (e.g., waterfalls). Successful protection efforts occur with cooperation from local landowners and governments. Just as urban homes and businesses flank the creek, sizable portions of the watershed outside of the City of Syracuse are working lands: farms and forests that support rural livelihoods. The West Branch of Onondaga Creek and the upper headwaters of the main branch (Vesper and Tully Valley) are particularly characterized by agricultural land (see Onondaga Creek Fact Sheets Access and Land Use and Land Cover, Appendix B).

These areas form the headwaters of Onondaga Creek and impacts to their surroundings affect the nature of the creek downstream. Headwaters have profound influence on shaping downstream water quantity and quality (Alexander et al. 2007). Additionally, headwaters are vital to maintaining biodiversity of entire river networks; degradation threatens both aquatic and riparian ecosystems downstream (Meyer et al. 2007).

There is value in protecting rural areas as they impact the quality of Onondaga Creek, but also to preserve the benefits of working lands. Protection of farmland can bring benefits to the local community in preserving economic viability, better quality of life and production of local food supply (Lynch 2007). Described below are implementation strategies that may preserve the quality of the creek and a way of life.

Three groups of stream protective measures or programs will be briefly presented here; they are appropriate for the suburban to rural portions of the Onondaga Creek watershed. These groupings include 1) regulatory (mostly for local governments), 2) land acquisition (for local government and land trusts) and 3) assistance programs only available for local landowners (such as agricultural landowners). For a complete listing of other measures and overall planning process please see Smardon et al. (1996), Cylinder et al. (2004),

Kusler and Ophiem (1996), Nolon (2003) and WWF (1992).

## Regulatory Measures

Local governments within the Onondaga Creek watershed may consider adopting some of the following measures. A government's ability to use these strategies depends upon the enabling statutes the municipality uses to adopt land use regulations. Some measures can be intermunicipal. Ideally, local governments will use these measures with an updated municipal comprehensive plan.

### Conservation Area Overlay District (CAOD)

A Conservation Area Overlay District (CAOD) can protect areas that are ecologically important or sensitive to development (Nolon 2003).<sup>1</sup> Riparian areas adjacent to Onondaga Creek and its tributaries are both. A CAOD is established by municipal zoning law. Some communities such as Penfield and Kingston, in New York State, have used overlay zoning to protect floodplains, scenic and historic areas (Nolon 2003). The broad authority to create this type of zoning, in New York State is found in the Municipal Home Rule Law. This law gives local governments the power to adopt laws relating to their "property, affairs or government", to "the protection and enhancement of [their] physical and visual environment", and to matters delegated to them under the statutes of local governments (New York Municipal Home Rule Law S10 (1)). Furthermore, this law allows local municipalities to "adopt, amend and repeal *zoning regulations* and perform comprehensive or other planning work related to [their] jurisdiction" (New York Municipal Home Rule Law S10 (6) and 10(7)). (Nolon 2003)

If a community is interested in applying a CAOD, the local municipality needs to map the landscape area that the overlay district is to protect. Note, CAOD's are used over existing zoning districts (see Figure 8.1). In areas without zoning, this regulatory measure must be adopted as zoning to create a conservation area district. A model CAOD law for New York was created by the Pace University Land Use Law Center for the Metropolitan Conservation Alliance, a program of the Wildlife Conservation Society (Metropolitan Conservation Alliance 2002, Nolon 2003). The model law contains the criteria for designating these critical areas as identified on the map. This is for an important reason; it provides a solid rationale such as flooding safety, prevention of erosion, protection of habitat; so that the law can

<sup>1</sup>A CAOD can be established to preserve a wide variety of natural settings such as wetlands, floodplains, critical habitat, including that of rare, threatened or endangered species, important biotic communities and plant assemblages, and unique geologic formations or features such as waterfalls, caves or caverns, ravines, drumlins, moraines escarpments or plateaus. A CAOD can also be used for source water protection of ground or surface waters or watersheds used for drinking water supplies.

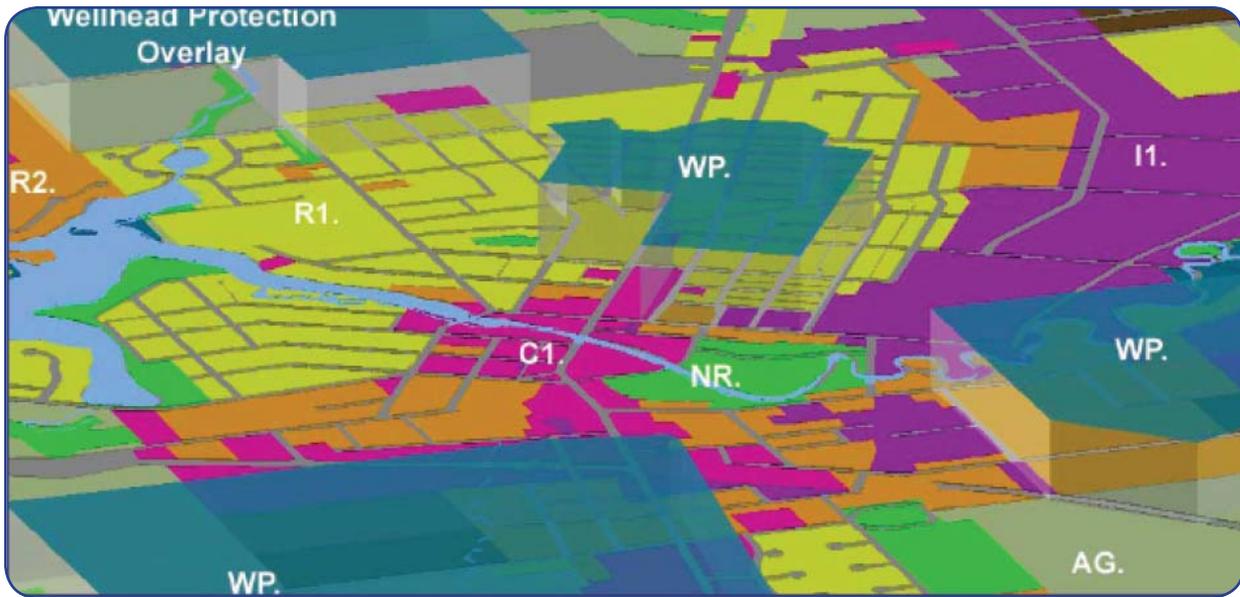


Figure 8.1: Example of wellhead overlay zone map on top of existing zoning (NYS DOS/DEC 2004)

not be easily challenged. There have been cases when so-called “open space zoning” have been challenged as a taking of private property rights (Smardon 1993). The CAOD should set out performance standards to minimize ecological damage to Onondaga Creek, and its tributaries (i.e., no diminishment of floodplain capacity or sediment in excess of a certain amount).

The CAOD can also be intermunicipal, crossing over different town and village jurisdictions. New York State statutes define an intermunicipal overlay district as a “special land use district which incorporates all or a portion of one or more municipalities for the purpose of protecting, enhancing or developing one or more community resources” (New York Town Law s 284, New York Village Law s 7-741, and New York Gen City Law s20-g). More specific information about model CAOD regulations can be found in Nolon (2003 p 226-234).

### Erosion and Sediment Control Ordinance

In the upper parts of the Onondaga Creek watershed, much of the impact on water quality is due to excessive sediment runoff from various sources entering the creek and tributaries during storm events. Certain municipal governments need to implement Phase II of the U.S. Clean Water Act by obtaining permits and developing *Stormwater Management Programs*. Local municipalities that have adopted erosion and sediment control ordinances as part of Phase II might update them to maximize protection to Onondaga Creek. Such an ordinance was passed in Yorktown, New York. This ordinance requires individual landowners to obtain a permit for any land-disturbing activities that are not specifically exempted. Each permit

application must contain information about site conditions and the proposed activity, together with an erosion and sediment control plan. The only drawback is that a local municipality would need qualified staff time to review such materials. A model regulation is presented with all its various parts in Nolon (2003 p 239-272).

### Stream Buffer Strips

Buffer strips are a barrier between conflicting land uses, or as in this case, between development and important community or natural resources such as Onondaga Creek and its tributaries. Located at the edge or boundary between two uses, a stream buffer can reduce conflicts and protect sensitive environments from the negative impacts of development or other incompatible activity. Buffers, in this case, are usually areas of riparian or streamside vegetation, but also can be landscaped berms. By using a variety of planning and zoning tools, Friends of Kayaderosseras Creek are developing a vegetative stream buffer program through five towns with 100 feet as a minimum width, 250 feet whenever possible and 1000 feet in environmentally sensitive areas such as floodplains and those areas with conservation easements (Woolbright 2005). Buffer strips can be combined with conservation easements (see below) or overlay districts.

### Non-Regulatory Land Purchase Mechanisms

The following measures can be implemented by local government or state agencies as well as nonprofit organizations such as land trusts.

### Land Purchases

Outright purchases can be accomplished through a conservation sale, a fee simple acquisition, or a land donation.

A **conservation sale** involves a landowner selling their property at less than full market value to a public agency or private land trust. The difference between this value and the market price is considered a charitable gift. Landowners receive both monetary compensation and tax benefits. An example would be the Tracy Lake property at the intersection of Tully Farms Road and Route 80 in Tully, which was bought by Save the County Land Trust. The buyer can prevent future development on the property by placing a conservation easement on it (see below).

A **fee simple acquisition** is an outright purchase of land. Once purchased, the land can be leased or sold back to private ownership with attached conservation easements. Governments in New York State can purchase land on a voluntary basis on the authority of the General Municipal Law 247. Local governments in Central New York have been known to purchase land adjacent to creeks to create local public parks (e.g., Marcellus Park along Ninemile Creek).

A **land donation** occurs when landowners donate their property to a public agency or private non-profit organization (such as a land trust). As with the donation of development rights, parcel donations are considered charitable, allowing a tax benefit. Landowners who donate land sometimes retain the right to use the land for a specified length of time, usually until death, and they may also request a conservation easement protecting the land from development. A parcel in LaFayette, south of the Onondaga Creek-Route 20 crossing, was such a donation to Save the County Land Trust.

### Easements

Many state and local governments and private land trusts acquire **conservation easements** (development rights) on properties to preserve land. This requires legally separating the development rights of the property from other property rights, so that further development is prevented. All conservation easements are voluntary and may be permanent or short term. It is in the best interests of land trusts to purchase conservation easements with protections guaranteed in perpetuity, rather than short term easements. Land with a conservation easement can be sold or transformed to others, but the land

use is limited by restrictions in the easement. Conservation easements are defined under New York State Consolidated Laws; Environmental Conservation Title 3 ss 49-0301. Conservation easements have and are being used for stream protection in New York State in such locations as: Kayaderosoras Creek in Greenfield, Milton, Malta, Ballston Spa and Saratoga Springs, Clove Creek in the Hudson Highland region, Tug Hill Tomorrow Land Trust, Boquet River near Lake Champlain, Rondout Creek near the Hudson, and within the New York City water supply for the Catskill and Delaware watersheds.

Voluntary agreements are negotiated between the landowner and the local government or land trust. Those holding a conservation easement are responsible for monitoring and enforcing the provisions of the agreement. Allowed uses are usually flexible such as agricultural, limited forestry or recreational use. Land with a conservation easement remains privately owned and managed, but also remains on the tax rolls at a reduced tax appraisal. The value of the development right is generally determined based on the difference between the land value for development and its present non-developed value. The reduced tax appraisal will vary depending on the land values and amount of development pressure of any given municipality. According to federal law, easements donated for conservation purposes must provide “significant public benefit”. Very careful documentation of conditions before easement acquisition plus monitoring after is needed according to the National Land Trust Alliance (<http://www.lta.org>) and according to several key reference sources (see Barrett and Nagel 1996, Bick and Haney 2001, Diehl and Barrett 1988, and Gustanski and Squires 2000). Locally the Finger Lakes Land Trust has had the most experience with conservation easements. Note that conservation easements can be used in conjunction with stream buffers, conservation land sales and land donations.

Unlike conservation easements, which are restrictive, **fishing access easements** are “positive” easements because they provide access across privately owned land for fishing. The New York State Department of Environmental Conservation (NYSDEC) has acquired many miles of fishing access easements on streams across New York State. They also have a state registry for state held fishing access easements (<http://www.dec.ny.gov/>), and some fishing books document many of the easement locations. Ninemile Creek in Marcellus and Camillus is a local example of

NYSDEC fishing access easements. Several miles of easement exist starting above the Route 173 railroad bridge overpass and running southward along the creek beyond the village of Camillus. The acquired fishing access easement is 16.5 feet from the centerline of the stream beyond the bank in both directions. If a land owner holds title to both sides of the stream, the easement is a combined 33 feet wide. Access points from public right of ways (e.g., roads) to the fishing access easement are still required, otherwise recreational fishers will be trespassing on private property to get to the fishing easement.

Along Ninemile Creek, for instance, several fishing pullout areas are located off Route 173 that allow such connective access. NYSDEC pays property owners per linear foot for fishing access easements. To be eligible for payment, the creek edges in question have to be surveyed by a licensed surveyor in order to calculate accurate linear footage.

### **Assistance Programs for Specific Landowners**

Special tax, conservation and management programs exist in New York State for agricultural landowners. These programs are summarized in American Farmland Trust's (AFT) **New York Agricultural Landowner Guide** (2001). Only those programs which will provide possible protection of water quality and habitat for Onondaga Creek, its tributaries, and the rural portions of the watershed are discussed below.

The first program is New York State's **Farmland Protection Program**, which provides grants to eligible municipalities to permanently protect land for agriculture. The grants can be used to purchase farmland development rights, thus allowing farming to continue with some of the farmland in conservation easements. This program is coordinated by the New York State Department of Agriculture and Markets. Two farms in Onondaga County have entered the program to date.

New York also has a state-wide, voluntary **Agricultural Environmental Management Program (AEM)**, which helps farmers address environmental issues, reduce liability and meet regulatory requirements. Farmers who participate in AEM receive a substantial cost-sharing arrangement to implement best management practices (BMPs) that address environmental risk. The AEM Program is administered cooperatively by several agencies (AFT 2001). The lead local

agency is the Onondaga County Soil and Water Conservation District (OCSWCD). More than 30 farms currently participate in the AEM Program in the Onondaga Lake watershed, assessing risk or implementing BMPs to reduce nonpoint source pollution (sediments, nutrients, pathogens, and pesticides) to Onondaga Creek and Lake. The AEM program offers 95% cost-sharing and is sponsored by the Onondaga Lake Partnership (OCSWCD 2007).

The **Environmental Quality Incentive Program (EQIP)** pays up to 75 percent of the cost for farms to implement structural and management practices on eligible agricultural land. Cost-share payments may be made to help farmers install erosion control measures and agricultural waste management facilities or to establish conservation practices such as nutrient management, manure management, and wild life habitat management (AFT 2001 p 10). In New York, EQIP has been used in combination with other programs to help farmers meet regulatory requirements and improve water quality. Many farms have undergone whole farm planning within the Skaneateles watershed in conjunction with the OCSWCD and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) to help qualify for EQIP.

The **Conservation Reserve Program (CRP)** encourages farmers to convert highly erodible cropland and other environmentally sensitive land to vegetative cover such as tame or native grasses; plants that benefit wildlife; tree filter strips; or riparian buffers. Participating farms receive annual rental payments for the multi-year term of their contracts (between ten and fifteen years). Cost-share funding is provided for the establishment of the vegetative cover practices. Landowners may also receive funding to fence streams that exclude livestock, build grass waterways or develop shallow water areas for livestock (AFT 2001 p10-11).

The **Wetland Reserve Program (WRP)** restores and protects wetlands on private property. Participating landowners are paid for permanent or temporary conservation easements that establish wetland protection and restoration as the primary use for the duration of the agreement. Landowners can receive as much as 100 percent of the appraised agricultural market value of the property for permanent conservation easements or 75 percent for thirty-year easements. A third option is ten year restoration agreements, which provides 75 percent of the restoration costs without the

“The tendency to view natural phenomena as static events, frozen in time, is a root cause of the aesthetic dilemmas that we face. When nature is seen as a continuum, the argument of what is beautiful or what is less so in the landscape becomes, if not meaningless, then of a very different order of meaning.... Landscapes may be created that are different from the original, but may result, none the less, in diverse and healthy environments.... Human or natural processes are constantly at work modifying the land. The nature of design is one of initiating purposeful and beneficial change, with ecology and people as its indispensable foundation.”  
–Michael Hough, *Cities and Natural Processes* p 5

requirement of a conservation easement (AFT 2001 p 11). For every program option, landowners continue to control access to their land. This is a very popular program for landowners with non-active muck farms in Oneida and Oswego Counties. Candace Blumfield, a graduate student at SUNY College of Environmental Science and Forestry (SUNY ESF) has performed a statewide survey of participant satisfaction of the program on behalf of the NRCS in Syracuse.

The **Wildlife Habitat Incentives Program (WHIP)** offers financial incentives to agricultural landowners who maintain habitat for fish and wildlife. Participating landowners work with the NRCS to create wildlife habitat development plans that list goals and practices needed to improve wildlife habitat (AFT 2001 p 11). The NRCS provides up to 75 percent in cost-share assistance. In New York State, most WHIP funding has been used for development of grassland bird habitat.

### Urban Strategies

The development of the Onondaga Creek corridor through Onondaga County needs to take into account the issues raised by Hough (left margin); but also the mounting research findings that attribute a rise in property values, and subsequently property tax base near, or proximate, to parks and open space (Crompton 2006). Onondaga Creek flows through some of the most economically disadvantaged neighborhoods within the City of Syracuse that exhibit high rates of disinvestment and abandonment, a plight not uncommon to northeastern “rustbelt” communities. In these neighborhoods the creek has been lamented as an open sewer (Giattina et al. 2006,

Adams 2003). The creek corridor and the adjacent vacant lands should be considered part of the neighborhood planning and development process; they can become an integral part of the urban fabric, elevate the quality of life for residents, and become an attraction for visitors (Bonham 2002). A major goal of the revitalization process will be to transform the creek corridor into a “multi-functional, productive, and working landscape that integrate[s] ecology, people, and economy” (Hough 1995).

Many groups and organizations see the creek as an asset. The creek corridor can be enhanced as an urban greenway (*open space*) providing recreational opportunities, new cultural and heritage areas, and protected areas for the natural habitats of indigenous plants and animals (Bonham 2002). At its core, the revitalization of Onondaga Creek will need to consider ecological as well as neighborhood health (including both social and economic concerns).

Within the city, there are possibilities for *renaturalization* along the creek, developing connections to the city’s larger open space network, and exploring possibilities for improving the overall health of the urban watershed by employing an integrative and ecological approach to stormwater management. Alternative stormwater systems focus on infiltration and treat stormwater as part of the hydrologic cycle, thereby enhancing aquatic and terrestrial habitats. Natural processes are incorporated into larger urban open-space networks, as BMPs, and are chosen for their specific function and suitability to particular sites (Condon 1999).



Figure 8.2 Green Roof: Solaire Building, New York.  
Photo: Earth Observatory

### The Proximate Principal: higher market values for properties located near a park or open space

The **proximate principle** suggests that the value of a specified amenity (i.e., a park or open space) is at least partially represented in the price of residential properties near it. For example, if home locations adjacent or near Onondaga Creek are desirable, the extra dollars that home buyers are willing to pay for a home in that location represents the increased value of land near the creek. As property values rise, owners typically are required to pay increased property taxes. The additional tax base that is generated from the increase in property values adjacent to an enhanced open space resource may be sufficient to cover the annual cost of acquiring, developing and even maintaining the land. Enhancement of the tax base is a net gain to a city's annual income. In addition to the personal gains enjoyed by those living in close enough proximity to open spaces, an entire community may indirectly benefit from increased municipal expenditures and improvements to open space systems through increases in the tax base. In addition, community residents living outside the zone of a greenway's proximate influence have access to the facility without paying additional taxes for the privilege. (Crompton 2001)

In the more heavily developed zones along the corridor *green infrastructure* practices, like green roofing (see Figure 8.2) and on-site stormwater detention facilities, can be employed. Whenever practical, in order to protect water quality and aquatic habitat, a minimum stream buffer of 100 feet is recommended, especially if filtering pollutants is a goal (Stormwater Manager's Resource Center 2003, Otto et al. 2004). The most important section of a stream buffer is the first 25 feet of land from the edge of the water; development within this zone should be extremely limited. Referred to as the streamside zone, this area includes the stream bank, canopy trees that overhang the stream, and aquatic vegetation along the water's edge (MacBroom 1998, University of Georgia Institute of Ecology 2003, Washington County Soil and Water Conservation District 1999).

Concerns were raised throughout the visioning process regarding future affordability and gentrification along the creek corridor as improvements are made to the creek; especially within those neighborhoods that currently are experiencing disinvestment. This issue can be viewed as two-sided. On the one hand, these areas are a financial drain to the city because of declining tax base and although they may be "affordable;" the housing stock is deteriorating due to deferred maintenance and neglect. Property values fall, which leads to further deterioration. Studies have shown that investment in parks and open space increase the value of surrounding property (Crompton 2006, see text box above).

On the other hand, when property values increase, some lower income and more transient parts of the population may be displaced in the process. This latter concern can be addressed through careful preparation and the implementation of comprehensive neighborhood revitalization tools:

- Promote homeownership with initiatives such as those administered by Home

HeadQuarters, Inc., that provide credit counseling, homebuyer education, and down payment and closing cost assistance;

- Strengthen the educational system within city neighborhoods to improve the life chances, or opportunities to improve quality of life, of original neighborhood residents;
- Encourage affordable housing development both for home ownership (as in the case of the Jubilee Homes Land Trust) and for renters (such as those currently operated by Syracuse Model Neighborhood Corporation); and
- Improve connections between neighborhood residents and the economic development engines of the region as well as small-scale business development along neighborhood commercial strips (working in concert with the Southside Innovation Center through Syracuse University) (Kennedy 2001).

The urbanized portions of the Onondaga Creek corridor can be divided into four general segments (further defined into potential project areas by the Project Team): **Lakefront** (Inner Harbor and Franklin Square), **Downtown** (Clinton Square and Armory Square), **Southside** (Southside and the Botanical Garden Area), and the **Valley** (North Valley and South Valley). Each of these areas exhibits a different context for the creek and each will require different design solutions described in relation to the maps that follow (maps identify properties within 500 feet of the creek).

The OCRP is meant to be a guide and a resource for the communities that lie within the Onondaga Creek watershed. Future efforts to implement stream revitalization opportunities in existing land use patterns will require collaboration between multiple local governments, regulatory agencies, private property owners and other stakeholders.

## Lakefront: Inner Harbor to Franklin Square

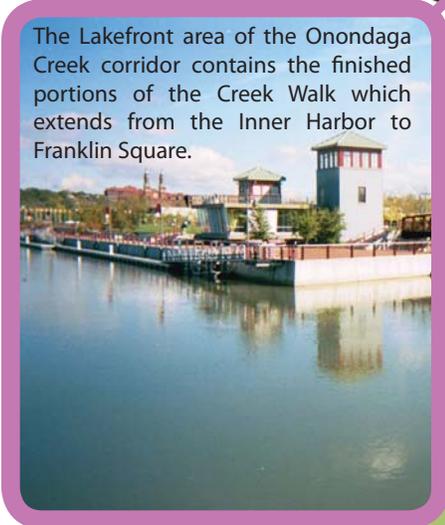
This area is dominated by the DestiNY USA project, Inner Harbor Redevelopment, and the ongoing revitalization of Franklin Square. The vacant land depicted within the DestiNY zone is mostly under the control of the Pyramid Companies and currently is being used as temporary surface parking while the mall expansion is underway. As the expansion has been advertised as a "green project," there should be discussion of incorporating green infrastructure that could include *green roofing*, on-site stormwater management facilities and on-site sewage treatment (*living machines*) to help to mitigate the impacts of the proposed development on water quality in the area.

**Legend**

-  Interstate
- Openspace - 500ft**
-  Wild, Forested Lands, and Parks
-  Recreation
-  Vacant Land
-  Vacant Farmland
-  Cultural Services
-  Parking
-  Roads
-  Creek Watershed
-  Parcels Outside Watershed
-  Onondaga Creek And Tributaries

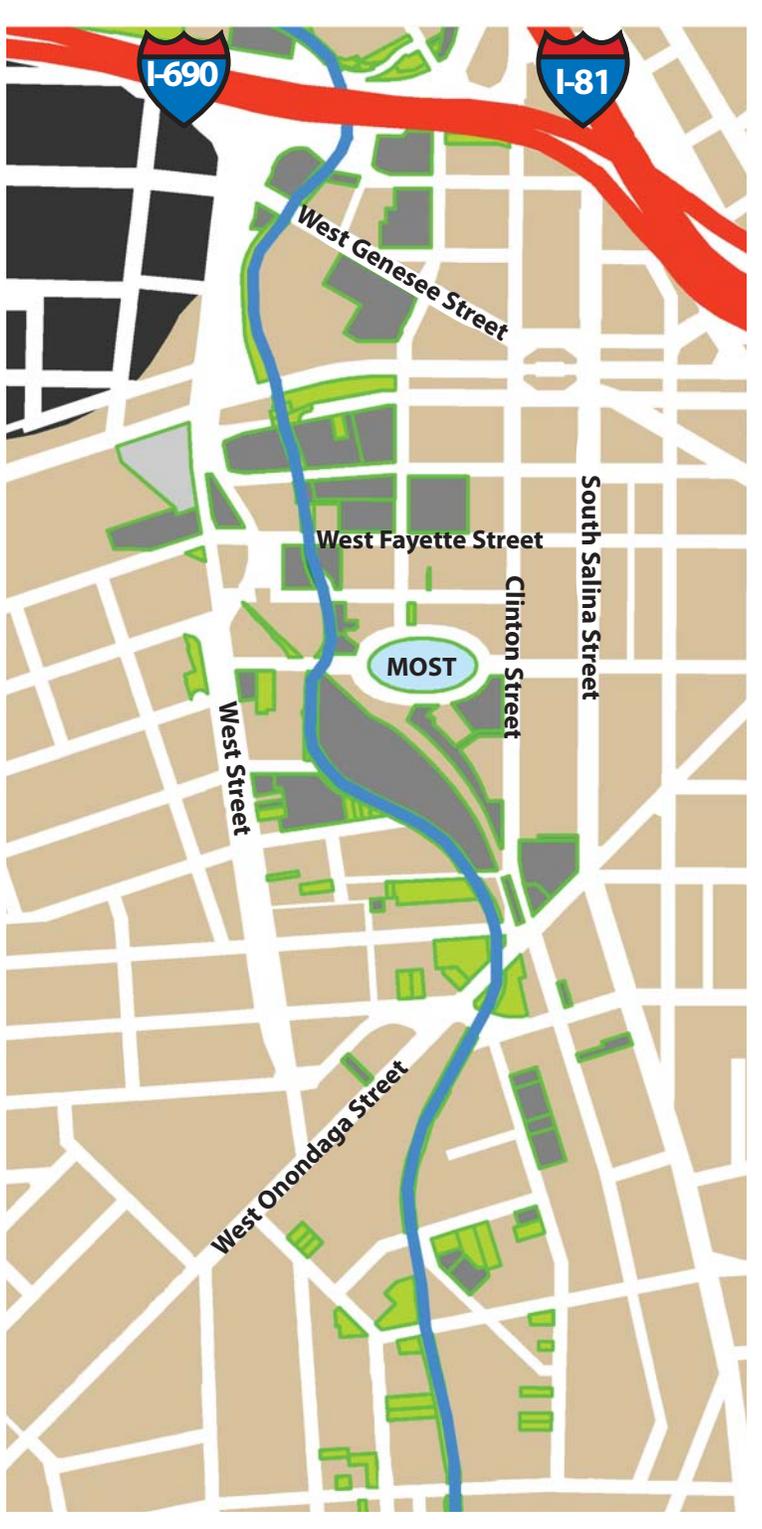


The Inner Harbor area is controlled by the New York State Empire Development Corporation and has been identified as an infill development area. Any new development should remain sensitive to water quality in the area by employing similar green infrastructure techniques as mentioned above. The 25 feet buffer area should be maintained along the water's edge whenever possible, area with larger green zones should maintain the 100 feet buffer.



Onondaga Creek joins the Inner Harbor just north of Kirkpatrick Street.

## Downtown: Clinton Square and Armory Square

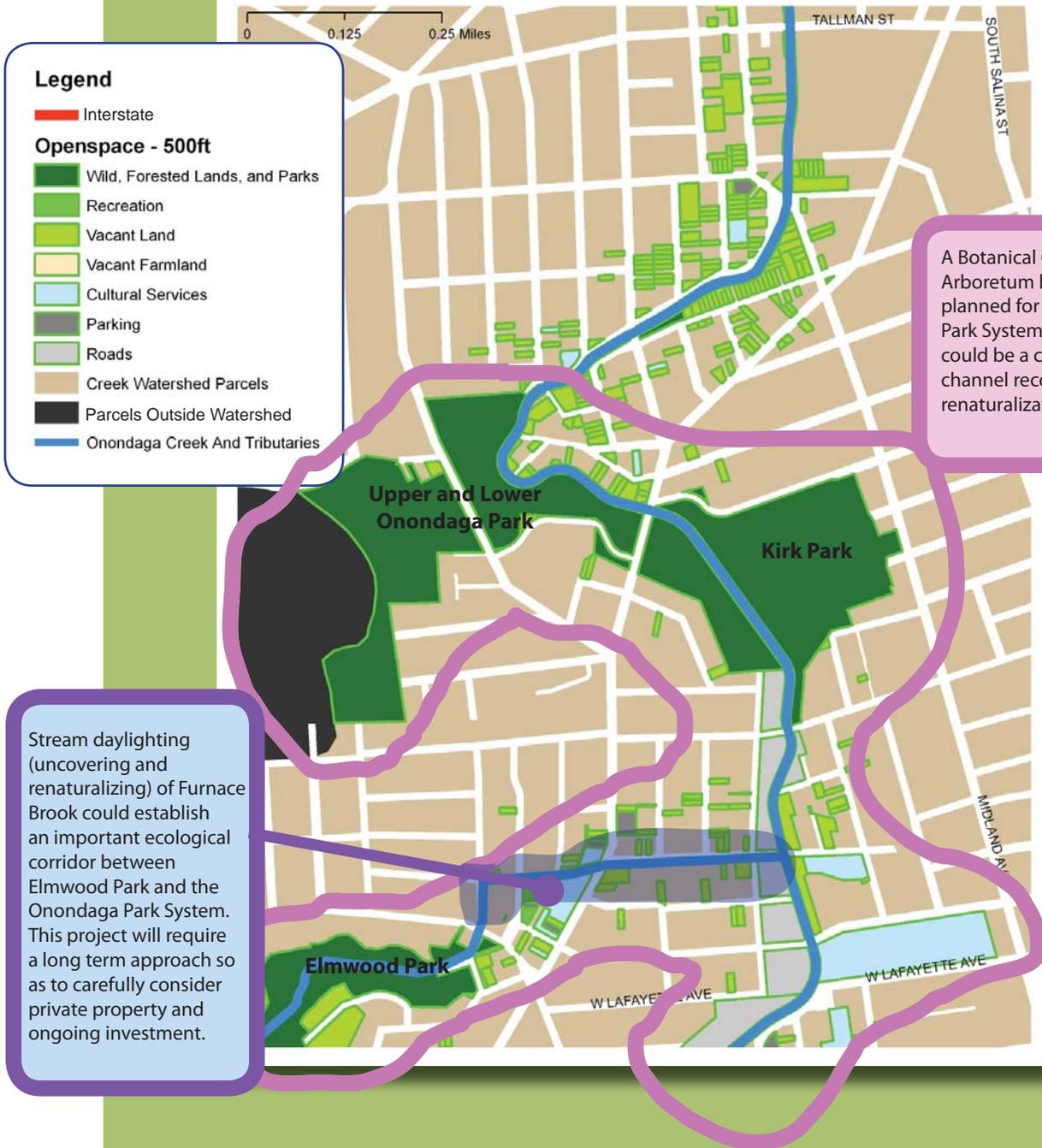


The Downtown area of the Onondaga Creek corridor is the most densely developed portion as it travels along the western edge of downtown Syracuse. The edges of the creek are defined by surface parking lots, parking garages, and office/residential buildings. In this area BMPs should be introduced that help to slow or reduce the amount of stormwater runoff that is reaching the creek. Employing green infrastructure techniques such as green roofing, on-site or streetscape stormwater management facilities, and increasing permeable surfaces within the areas adjacent to the creek could help to decrease the impacts of stormwater on the creek. Economic development projects should capitalize on the presence of the creek by developing promenades, cafes, shops, pocket parks and public art along the corridor. Parking facilities should incorporate BMPs and green infrastructure to improve their ability to capture stormwater and allow for on-site infiltration. The development of the Creek Walk from Armory Square to Franklin Square and the Inner Harbor can be an important catalyst and recreational amenity to spur new downtown residential development as the corridor will eventually link up to the Onondaga Lake Loop the Lake trail.



## Southside: Midland RTF to Botanical Garden and Arboretum

A string of publicly owned and controlled lands border the creek from Tallman Street south through the Onondaga Park System (upper Onondaga, Lower Onondaga, and Kirk Parks) and along Onondaga Creek Boulevard to Ballantyne Road; these lands include parks, school grounds, recreational areas, and vacant land. These areas provide an opportunity for *channel reconfiguration* and renaturalization. Some work has been conducted by SUNY ESF, led by Dr. Theodore Endreny, to engineer possible channel modifications in this area. Green infrastructure techniques should be employed in the adjacent neighborhoods including green roofing, on-site stormwater management facilities like *rain gardens* and rain barrels, as well as permeable pavements to help to improve water quality.



## Valley: North Valley and South Valley



A string of publicly owned and controlled lands border the creek from the intersection of the culverted Furnace Brook with Onondaga Creek south into Nedrow; these lands include parks, school grounds, recreational areas, and vacant land. Collectively, these areas provide an opportunity for channel reconfiguration and renaturalization. Daylighting of Furnace Brook could establish an important ecological corridor from Onondaga Community College through the Corcoran High School campus and Elmwood Park and into the Onondaga Creek corridor. Arsenal Park and lands along the creek from Dorwin Avenue to Route 173 possess ample open space to restore stream meanders and contain *floodplain*. School grounds can be integrated into the creek corridor through specially designed curricula tied to ecological literacy and the health of Onondaga Creek. Green infrastructure techniques should be employed in the adjacent neighborhoods including green roofing, on-site stormwater management facilities like rain gardens and rain barrels, as well as *permeable pavements* to help to improve water quality in the area.





# Establishment of Design and Sustainability Standards

Revitalization of the Onondaga Creek corridor will require the successful integration of ecological, social and economic concerns. Onondaga Creek flows through rural hinterlands, suburban subdivisions, urban neighborhoods, and downtown districts on its way to Onondaga Lake. Each of these areas has unique characteristics, and will require the utilization of different materials, methods, and strategies for their reclamation. Environmentally sensitive redevelopment of the creek including public amenities such as parks and trails, cultural attractions, commercial buildings, and housing can draw new investments to our region and improve the quality of life for Central New York residents.

Planning must reconcile development, flood control, and recreation with environmental designs and strategies that enhance Onondaga Creek's ecological integrity. In addition, planning for the creek should incorporate green design elements that can help to cultivate environmental *stewardship* through community education that builds the community's awareness of ecological principles (Rhodeside & Harwell Inc. 2006).

Stream buffers are a key design standard for Onondaga Creek; aquatic habitat degradation is caused by loss of *riparian* vegetation along the entire length of the creek (see Aquatic Habitat Fact Sheet, Appendix B). Stream buffers are critical for protecting water quality in rural portions of the creek. Within urban sections of the corridor, a minimum of a 100 foot-wide stream buffer is recommended (see discussion under Urban Strategies, previous section).

The revitalization of the Onondaga Creek corridor should incorporate the following principles adapted from **Ecological Riverfront Design: Restoring Rivers, Connecting Communities** (Otto et al. 2004). These principles were developed after careful study of river initiatives across the United States and can help to guide the successful revitalization and restoration of the creek corridor.

**“Cities are rediscovering their rivers. For at least the past 30 years, cities and towns have been turning back to their rivers, transforming industrial and derelict land into new parks, residences, and commercial space. The trend appears to be continuing and perhaps even accelerating, with major planning and construction efforts underway in cities around the country. After abusing urban rivers through years of hard use and neglect, we have come to realize they are valuable economic and community assets. While this renaissance movement has been overwhelmingly positive....Too often, the river itself is not considered, an oversight that ignores the possibilities for enhancing the ecological value of the river....To take advantage of this opportunity, we need to effectively integrate ecological considerations with economic and social goals along the nation’s urban rivers.”**

**-Rebecca R. Wodder,  
President  
American Rivers  
(Otto et al. 2004, p v-vi)**

## GENERAL PRINCIPLES

General Principle 1: Ecological goals and economic development goals are mutually beneficial

General Principle 2: Protect and restore natural creek features and functions

General Principle 3: Regenerate the creekfront as a human realm

General Principle 4: Compromises and collaboration are necessary to achieve multiple objectives

General Principle 5: Make the process of planning for and designing the Onondaga Creek Corridor broadly participatory

## PLANNING PRINCIPLES

Planning Principle 1: Demonstrate characteristics of each community's unique relationship to the creek in the creekfront design

Planning Principle 2: Know the creek ecosystem and plan for a scale larger than the immediate creek corridor (consider the watershed)

Planning Principle 3: Because the creek is dynamic, minimize new floodplain development

Planning Principle 4: Provide for public access, connections, and recreational uses

Planning Principle 5: Celebrate the creek's environmental and cultural history through public education programs, signage, and events

## DESIGN PRINCIPLES

Design Principle 1: Preserve natural creek features and functions

Design Principle 2: Buffer sensitive natural areas

Design Principle 3: Restore riparian and in-stream habitats

Design Principle 4: Use nonstructural alternatives to manage water resources (i.e., using plants to stabilize watershed slopes instead of concrete walls)

Design Principle 5: Reduce hardscapes, e.g., paved areas

Design Principle 6: Manage stormwater on site and use nonstructural approaches (i.e., green infrastructure)

Design Principle 7: Balance recreational and public access goals with creek protection

Design Principle 8: Incorporate information about the creek's natural resources and cultural history into the design of creekfront features, public art, and interpretive signs

It is important to consider the interface between the Onondaga Creek corridor and the surrounding geographical context. Once the creek enters Nedrow and the southern reaches of the City of Syracuse a balance will need to be struck between the desire for ecological restoration and the need for neighborhood revitalization. Restoration of the creek itself cannot be separate from the development of a comprehensive vision for the revitalization of urban residential neighborhoods including the development of recreational and open space amenities, transportation alternatives, economic development opportunities, and affordable housing development.

Design of the ultra-urban portions of the creek corridor, where limited opportunities for the regrading of the channel exists, will need to consider adequate safety measures to prevent people from direct access to the steep banks and swift currents of the creek during periods of high flow. Where possible vacant and/or derelict lands that are adjacent to the creek corridor should be considered for their potential to act as additional buffer areas and incorporated as part of the corridor.

Ecological revitalization of the creek can serve as a catalyst for social and economic sustainability for surrounding neighborhoods. Lessons for the urban sections of Onondaga Creek can be drawn from the Bronx River in New York City. The Bronx River Alliance and Sustainable South Bronx are two organizations that are setting the standard for linking river and neighborhood revitalization (see Case Studies Guide, Appendix C).

The rural headwaters sustain all of Onondaga Creek (see Rural Strategies). Sustainable development near the headwaters can be designed to meet the needs of the present without compromising the ability of future generations to meet their own needs (adapted from World Commission on Environment and Development 1987). This includes sustaining healthy streams with good water quality. In rural areas, use of BMPs are an approach to manage agricultural stormwater runoff that can contain manure and pesticide residues (see Appendix I).

### **Establishment of standards for ecological creek restoration**

As a complement to design and sustainability standards, this section presents standards for ecologically successful creek restoration. Stan-

dards for ecological restoration of Onondaga Creek acknowledge our responsibility not only for human needs, but to meet the needs for other species as well. Creeks and rivers provide ecological structure, the form or “architecture” of diverse habitats for a large range of aquatic and terrestrial species. Anthropogenic, or human-influenced, stressors placed on these ecosystems are growing rapidly, due to climate change, industrialization, overdevelopment, overexploitation, and pollution. Thus there is a critical need for river restoration that maintains ecological structure and reinstates ecosystem function, the processes and interactions that operate within an ecosystem. (Giller 2005)

Many attempts worldwide are being made to redress impacts of human use (and misuse) of freshwater resources; some projects are attracting huge financial investment (Giller 2005). Yet there is little agreement on what constitutes a successful river restoration project (Palmer et al. 2005). In a series of articles in the **Journal of Applied Ecology** in 2005, leading restoration scientists proposed criteria for evaluating river restoration projects. The following standards are borrowed from those articles.<sup>2</sup>

#### **Ecological Standard 1: “A guiding image exists: a dynamic ecological endpoint is identified (in advance) and used to guide the restoration.”**

The first step in restoration is to identify a guiding image that describes Onondaga Creek as an ecologically healthy river that could exist in its current location. The restoration goal is to move the creek towards its least degraded and most ecologically dynamic, or functionally active, state possible, given the regional context. The goal of re-establishing a coldwater fishery may serve as the guiding image. Sustaining an indigenous coldwater fish such as brook trout would indicate that most ecological requirements have been met.

#### **Ecological Standard 2: “Ecosystems are improved: the ecological conditions of the river are measurably enhanced.”**

Onondaga Creek will experience measurable changes that move it toward the guiding image. Measurable changes include easily recognizable signs of ecological recovery, such as re-establishing an extirpated fish population and improved water quality and clarity.

<sup>2</sup> Standards are borrowed from Palmer et al. *Standards for ecologically successful river restoration*, and Jansson et al. *Stating mechanisms and refining criteria for ecologically successful river restoration: a comment on Palmer et al. (2005)*, *Journal of Applied Ecology*, 2005, Issue 42, p208-222.

**Ecological Standard 3:** “Resilience is increased: the river ecosystem is more self-sustaining than prior to the restoration.”

Restoration projects involve reinstatement of natural river processes, such as channel movement, organic matter retention and river-floodplain exchanges. Thus, Onondaga Creek becomes a resilient self-sustaining system, meaning the system has the capacity to recover from rapid change and stress.

**Ecological Standard 4:** “No lasting harm is done: implementing the restoration does not inflict irreparable harm.”

All restoration projects, no matter the degree of intervention, minimize long-term impacts to Onondaga Creek, based on Aldo Leopold’s first “rule” of restoration: do no harm. An example of harm as a result of restoration would be if lamprey eel or any other exotic invaders could access the upper reaches of Onondaga Creek should barriers such as the Dorwin *drop structure* be removed.

**Ecological Standard 5:** “Ecological assessment is completed: some level of both pre- and post-project assessment is conducted and the information is made available.”

It is possible to declare restoration project success on Onondaga Creek only by starting with clear project objectives and ending with an evaluation of their achievement. Any pilot or demonstration project would require *efficacy testing* (demonstration of effectiveness), which is contingent upon proper design and pre- and post-monitoring. Information about all outcomes, both negative and positive, must be shared locally, regionally and nationally.

**Ecological Standard 6:** “The guiding image is supplemented by some description or prediction of the ecological mechanisms by which the intended restoration strategy will achieve its goal.”

The process of predicting intended ecological mechanisms prior to implementing particular restoration strategies for Onondaga Creek may identify potentially conflicting processes and allow for reconsideration of strategies. For instance, certain vegetation for habitat purposes may preclude vistas and cause safety concerns along isolated trails.

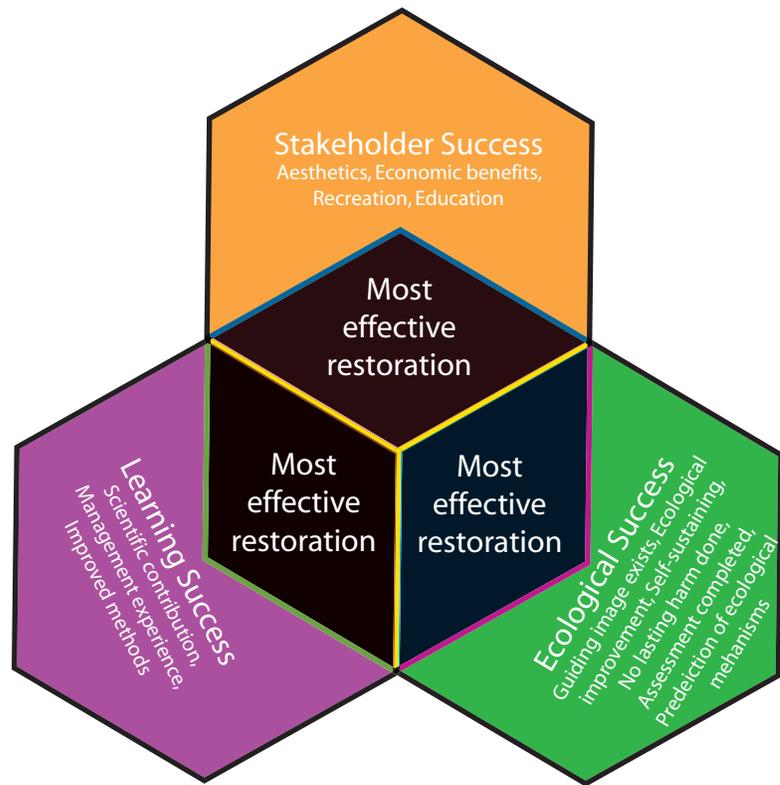


Figure 8.3 The most effective river restoration project lies at the nexus of three pillars of success: stakeholder, ecological and learning (adapted from Palmer et al. 2005).

The six standards described for successful river restoration projects focus on ecological criteria. Yet a successful project can be measured in many ways. Success can be measured with the design and sustainability standards described in the previous section or with a set of economic criteria. Meeting multiple goals, including ecological goals, and accommodating as many stakeholders as possible defines the most effective river restoration project. Ideally, ecological success forms one of three pillars for measuring success of river restoration projects. Two additional measures are stakeholder success (stakeholder needs are met) and learning success (advancing the science of river restoration). The most effective restoration lies at the nexus of the three, illustrated by Figure 8.3 (adapted from Palmer et al. 2005). Implementing ecological standards in this context will help lead to a successfully revitalized Onondaga Creek.

# Intermunicipal Agreements for Creek Watershed Management

Onondaga Creek passes through the City of Syracuse, the Towns of Tully, Lafayette, Onondaga, several villages, and the Onondaga Nation, a *sovereign* nation. One approach to managing resources that cross municipal boundaries is *intermunicipal agreements* (IMAs). Intermunicipal agreements in the Onondaga Creek watershed are most appropriate for use by local municipal governments. According to the New York State Office of the State Comptroller (NYSOSC) (2003) “Article 5-G of the General Municipal Law (SS119-m through 119-oo) provides broad authority for municipal corporations and districts to cooperate with each other in carrying out their respective responsibilities”.<sup>3</sup>

Intermunicipal agreements usually serve as a means of consolidating services, but a number of IMAs have been used for watershed management purposes. Nolon (1999) traces the use of IMAs as far back as 1992 for watershed management purposes with the Mianus River and the Titicus River Watershed in 1995 to more recent uses on Long Island. The NYSOSC has published a **Local Government Management Guide for Intermunicipal Cooperation** (2003) that provides a straight forward step-by-step guide for establishing IMAs. Pace Law School also developed background information on IMAs (Crisalli et al. 2007, Nolon 1999).

Relevant to the OCRP, an IMA is a sound policy that allows municipalities to work together to protect a shared natural resource. IMAs act as a mechanism for members to share resources and co-locate joint funding ventures. For example, IMA members may choose to designate a single grant administrator or share costs and supervision of enforcement personnel for land use regulations. IMAs can be employed to pass protection resolutions for resources such as critical habitats, endangered species, or water supplies. IMAs can also be used to work on mutually beneficial projects, establish joint planning or zoning boards, and adopt compatible zoning laws, comprehensive plans, floodplain and wetland laws, and other

land use regulations, including those for corridor development and watershed enhancement. (Crisalli et al. 2007)

*The following examples demonstrate how such agreements can be used for watershed management. All four cases are located in New York State.*

## **New York City Watershed Memorandum of Understanding**

The first example is the Memorandum of Understanding (MOU) signed in 1997 by New York City with the communities of the Catskill and Delaware Watersheds, US Environmental Protection Agency (USEPA), State of New York and other organizations in exchange for a water filtration avoidance waiver from USEPA. Rather than spend hundreds of millions of dollars on filtering its drinking water supply, this MOU enables a comprehensive watershed protection program to preserve and restore natural filtration conditions as a more cost effective means of maintaining water quality. Watershed management measures included land acquisition, comprehensive planning, disease surveillance and upgrading wastewater treatment plants belonging to other local municipalities that exist along source waters to New York City drinking water supply. Aspects of the New York City MOU that relate to Onondaga Creek include conservation easements along creeks feeding some of the reservoirs, and massive stream restoration work that has been performed by Greene County Soil and Water Conservation District. Some aspects of the program resemble the City of Syracuse's efforts to maintain water quality within the Skaneateles Lake watershed in conjunction with farmers and other landowners, NRCS and the OCSWCD.

<sup>3</sup> Article 5G defines *municipal corporation* as any county, city, town, village, fire or school district, or board of cooperative education services and defines *district* as a county or town improvement district.

### **Long Island Sound Watershed Intermunicipal Council**

In 1999, Long Island Sound's lobster population experienced massive mortalities, resulting in a commercial fishing failure. Populations have not recovered. After several years of study, researchers concluded that pesticides carried by stormwater runoff were one of the catalysts to the population collapse.

Motivated to form that same year, the Long Island Sound Watershed Intermunicipal Council (LISWIC) is made up of 12 cities, towns and villages that drain into the Long Island Sound. The municipalities are all within Westchester County, which is not a member of the LISWIC. The municipalities' IMA describes their goal to collectively make decisions for a cleaner Long Island Sound. The LISWIC shares information regarding development projects that have intermunicipal impacts, resolves disputes over development projects in environmentally-sensitive areas, develops compatible comprehensive plans and regulations, monitors and enforces regulations, and secures and shares funding.

Aware of the severity of stormwater's effect on the sound, LISWIC is exploring the feasibility of forming a regional stormwater management district. While other areas have stormwater utility districts operated at the county or state level, LISWIC is making the innovative proposal of governance by the municipalities themselves through a district board. The district will act as a single, fee-supported regional organization that will plan, fund and implement the stormwater management program for Long Island Sound. The proposed fee structure is a flat rate for single-family households and a pro-rated fee for non-residential properties based on the property's impervious surface area. Once the district is in place, municipalities expect to re-allocate or reduce local taxes currently devoted to stormwater management. (LISWIC updated 2008, Malcolm Pirnie Inc. 2007).

### **Sauquoit Creek Basin Intermunicipal Commission (SCBIC)**

This intermunicipal commission was created in 1999 and consists of six communities including the Towns of New Hartford and Whitestown and the Villages of New York Mills, New Hartford, Yorkville and Whitesboro. The initial stimulus for creation of the Sauquoit Creek Basin Intermunicipal Commission (SCBIC) was flooding (Cleveland 2007), but after incorporating in 2004 the SCBIC focused on stream erosion along with county and state agencies. Future projects may involve other agencies such as the New York State Department of Transportation. The SCBIC has also produced a thorough state-of-the-creek report that identifies creek resources and management issues within the watershed.

### **The Canandaigua Lake Watershed Council**

Canandaigua Lake is located in both of the New York Counties of Ontario and Yates. It is bounded by six municipal corporations, has a total of twelve municipal corporations within the watershed, and two others outside the watershed which use it for water supply. After a multiple year planning period beginning in 1989, the Canandaigua Lake Watershed Council (CLWC) issued a state-of-the-lake report and released several other studies. The CLWC entered into an Agreement for Services with the City of Canandaigua in August of 2001. This agreement also included the Towns of Gorham, South Bristol, Bristol, Canandaigua, Middlesex, Italy, Hopewell, Naples, Potter; Villages of Newark, Palmyra, Naples, and Rushville, and led to the development of an implementation plan for the Canandaigua Watershed that included some 23 different municipal entities.

Since 60,000 people depend on Canandaigua Lake for drinking water, the award-winning CLWC vigorously protects the water quality of the lake and its watershed. The CLWC runs a comprehensive monitoring program capable of stream prioritization based on pollutant loading, thereby focusing management efforts on appropriate tributaries. The council administers programs for stream restoration, compiling and sharing land cover data, capital improvement projects to prevent erosion, agricultural environmental management programs, and septic system regulation enforcement. (Canandaigua Lake Watershed Council 2006) The CLWC set the precedent for subsequent IMAs later established for Keuka Lake and Cayuga Lake watershed management entities as well.

# Funding Resources

The OCRP is meant to be a living, working document; in accordance, financial resources will need to be acquired and directed so that elements of the OCRP move towards implementation. Revitalization funding will require careful coordination to meet as many goals as possible. Implementation will require the participation of both the public and private sectors.

As evidenced via the series of community forums and stakeholder organization meetings, the public solidly supports Onondaga Creek revitalization. Revitalization will be a long-term process, accomplished step-by-step. Putting together a community-driven plan, developing implementation strategies and outlining next steps, allows efforts to be systematized, collated, and re-broadcast to the entire community in a way that builds further momentum towards ever larger actions. Success breeds success and encourages others to lend support and resources.

Onondaga Creek has already received resources from the community that were targeted for revitalization efforts; best separated into two categories:

1. Capital and maintenance activities that often occur outside the framework of creek revitalization, but at the same time positively impact the creek corridor and are congruent with the OCRP. Appendix K is a list of ongoing and pending projects in the corridor and many fit into this category.
2. Voluntary efforts being carried out by different organizations or agencies that fit into the framework of the OCRP, although not always determined with the goals of the OCRP in mind. These include OCSWCD's *Agricultural Environmental Management Program*, USGS's *Tully Valley Mudboil Control Program*, various monitoring programs conducted by the NYS-DEC, Onondaga County Department of Water Environmental Protection, Upstate Freshwater Institute, and OEI, including that performed on behalf of the Onondaga Nation, the Partnership for Onondaga Creek's advocacy work, rain garden initiatives sponsored by Cornell Cooperative Extension (CCE), Creek clean-ups also under CCE's general auspices, Creek days put on by Canopy, Atlantic States Legal Foundation working with the after school program at the

Dunbar Association, the ongoing Izaak Walton League/Project Watershed monitoring program, and SUNY ESF sponsoring a bio-blitz.

Practically speaking, the OCRP will not be funded and implemented by a single large appropriation. Revitalization will be a multiple-year process, characterized by long-range thinking, using many types of resources to accomplish goals. Elements of the OCRP will be implemented as discussed above and other pieces through dedicated funding made available through the hard work of citizens and government. Creative approaches will be necessary to steer resources towards those projects and recommendations which impart the greatest environmental, social, and economic benefits. The OCRP offers direction for the future revitalization and protection of the Onondaga Creek watershed. Funding mechanisms are just one of the many tools for achieving community goals.

## Potential Funding Streams

Appendix N, Funding Sources, contains a table of potential funding streams from federal, state and private sources. The table is adapted from a database accessed on the internet, compiled by the U.S. Department of the Interior National Park Service's Partnership Wild and Scenic Rivers (PWSR) program. The table is intended to serve as an introductory resource; rather than provide an exhaustive list of available funds. Each funding source should be researched to assess eligibility requirements and current availability of funds. Onondaga Environmental Institute welcomes suggested additions to this database.

## Conclusion

This chapter can help provide inspiration, ideas, and examples for strategies and resources to accomplish the work of revitalizing the Onondaga Creek corridor. Future efforts to incorporate the strategies described will take place over the long term at many levels, ideally shepherded through a community decision-making process, much like that embodied in the Onondaga Creek Working Group. Chapter 8 is meant to be a resource for this ongoing and evolving dialogue.

