SCAJAQUADA CREEK
Watershed Management Plan

Draft Watershed Management Plan
Scajaquada Creek Watershed
Erie County, New York
December 2002

Scajaquada Creek
Watershed Advisory Council

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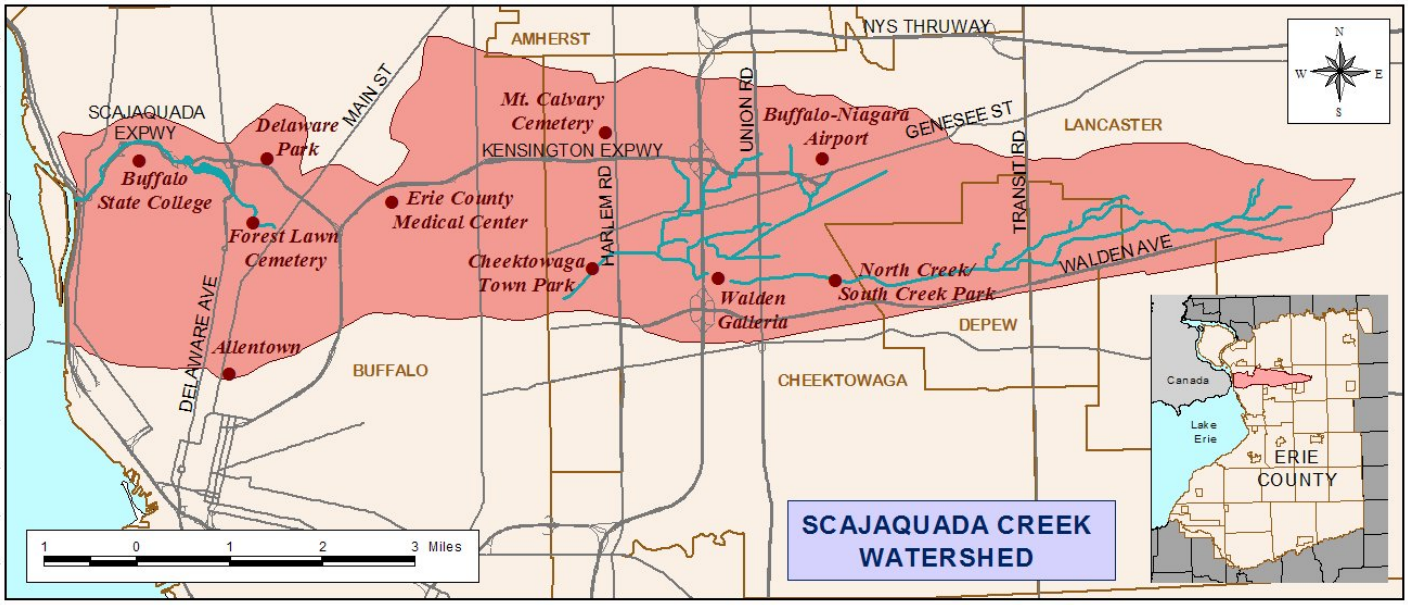

Cover Photos (clockwise from top left): *Hoyt Lake in Summer*—Sylvia Coles; *Winter on Scajaquada in Depew*—Ellen Hahn Ilardo; *Scajaquada Creek in Lancaster*—Dr. Shreeram Inamdar; *Tunnel Entrance in Cheektowaga*—Dr.Shreeram Inamdar; *Trash Rack next to Hoyt Lake*—Ellen Hahn Ilardo; *Shopping Carts at the Sill*—Ellen Hahn Ilardo

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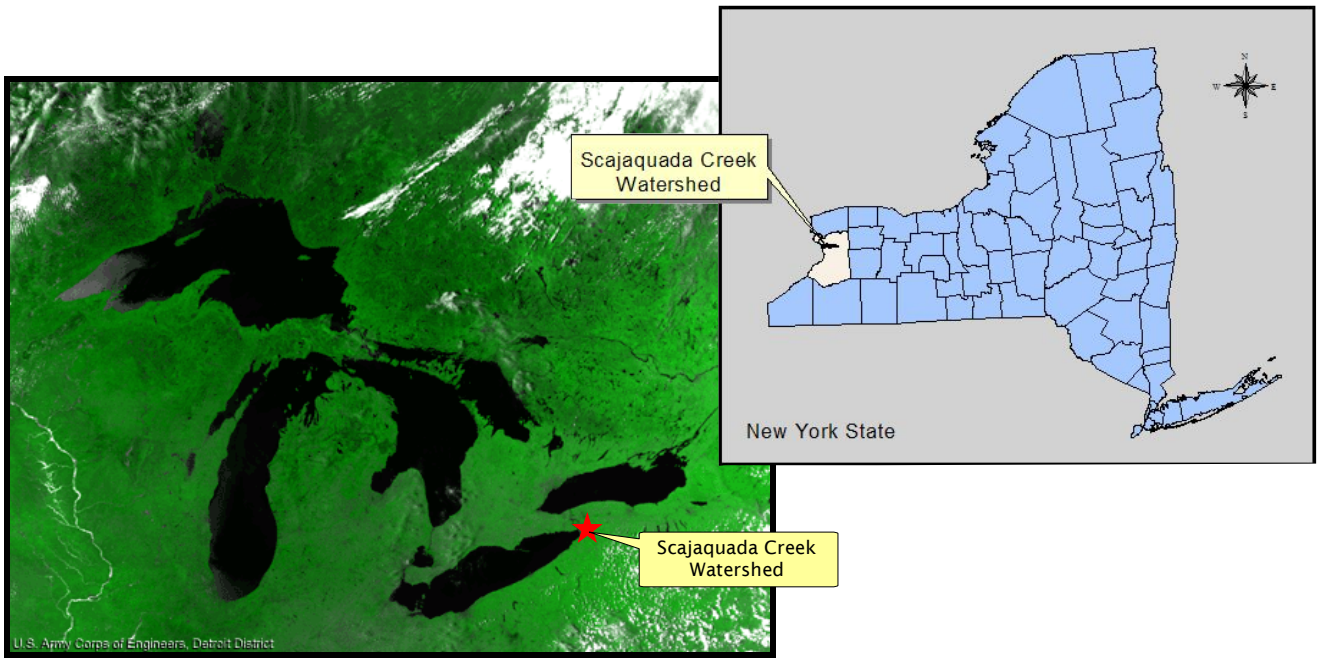
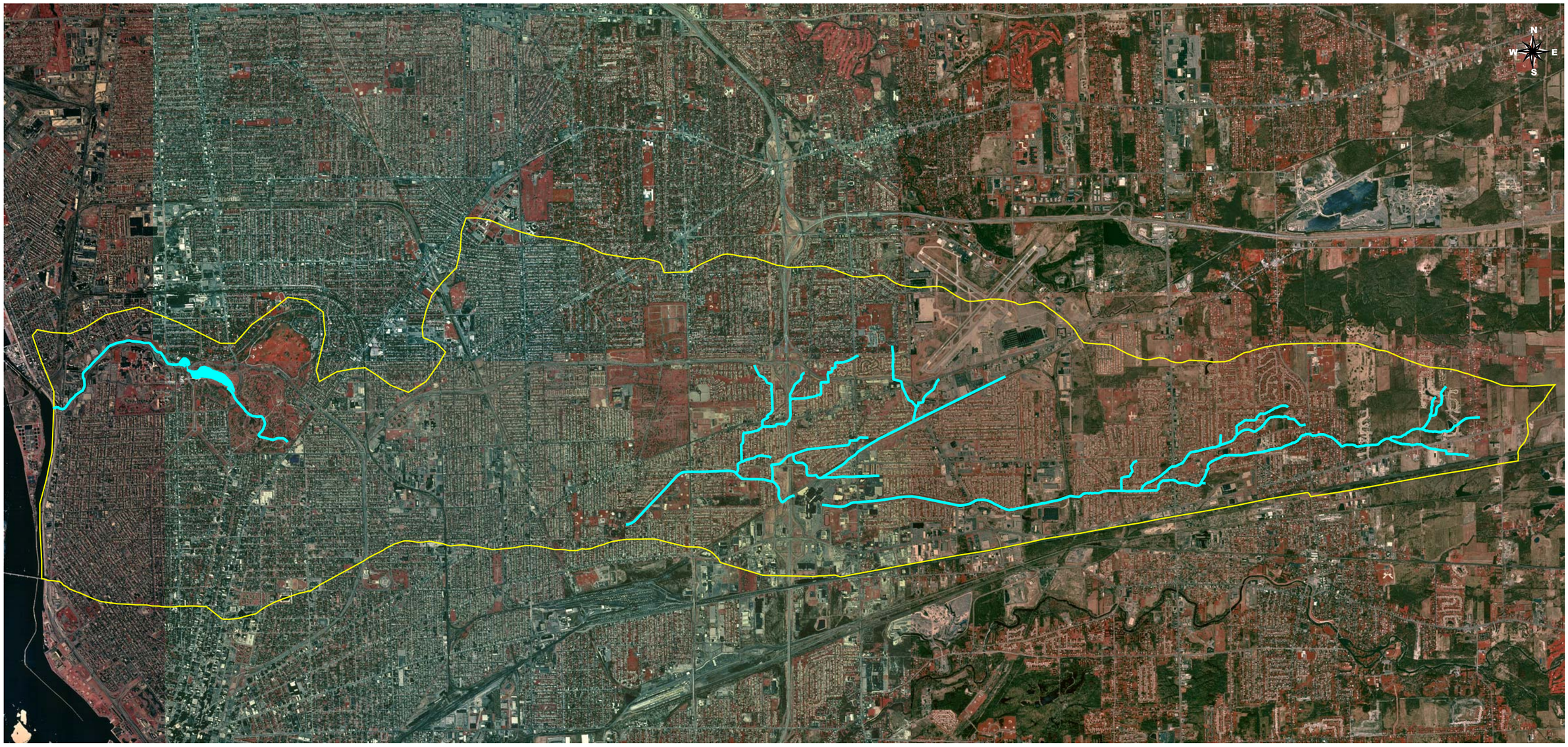




1 0 1 2 3 Miles

Scajaquada Creek and Tributaries

Scajaquada Creek Watershed

Scajaquada Creek Watershed Advisory Council
Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

National Digital Orthophotography Program
False-Color Infrared Aerial Photograph
Buffalo NW, Buffalo NE and Lancaster Quadrants
March 28, 1995

Scajaquada Creek Watershed

Erie County, New York

Aerial Photograph

Plate 1

Foreword

A Community-Based Watershed Management Plan

The Scajaquada Creek watershed is a 29 square mile urbanized sub-watershed of the Lake Ontario basin, and a tributary of the Niagara River. Scajaquada Creek and many of its tributaries have been channelized through developed areas and the main channel is routed through underground tunnels in three sections. Because Scajaquada Creek is located in a heavily developed area and has been highly manipulated, water quality, hydrologic regime, wildlife habitat and overall stream health have been degraded. Complete restoration of these parameters would be a challenging task, but much can be done to progress toward that goal. Permitted and unpermitted storm sewer discharges, SPDES (State Pollutant Discharge Elimination System) permitted discharges, and debris dumped in the stream, tributaries and drainage ditches are items of concern and can be addressed with public, municipal and corporate education programs.

The Scajaquada Creek Watershed Management Plan provides Watershed Management Goals, Objectives and Action Items to restore and protect the ecological quality of the watershed, that can be achieved through municipal capital improvement projects, grant-funded programs and community service projects. The Scajaquada Creek Watershed Advisory Council has provided input in the planning process as well as a forum for the watershed community to relate their environmental concerns.

The AmeriCorps team participating in the Great American Cleanup along the Scajaquada Pathway.

This Watershed Management Plan is a community-based approach to natural resources management. Local stakeholders are the final decision makers for implementing recommended practices. The Plan is based on watershed boundaries rather than political boundaries and considers the drainage area as a connected system, including tributaries and stormwater conveyances, to better identify and address environmental problems and document watershed improvements.

Land Use

Over 94,000 people live within the Scajaquada Creek Watershed (1990 U.S. Census), in five local municipalities: the City of Buffalo, Town of Cheektowaga, Village of Depew, Town of Lancaster and a small portion of the Village of Lancaster. Land use in the watershed is approximately 65% residential, 10% commercial/retail, 10% industrial, 10% open space (parks, cemeteries and vacant land) and 5% hospitals and schools. The Scajaquada Creek Watershed is home to Buffalo State College, Canisius College, and the Buffalo-Niagara International Airport. The creek flows through Forest Lawn Cemetery and Delaware Park—the largest Frederick Law Olmsted Park in Buffalo, as well as underneath Walden Galleria Mall. McKinley High School in Buffalo and Cheektowaga Union High School are both located next to the creek.

The narrow riparian corridor along Scajaquada Creek is one of the few naturally green areas in this densely developed urban watershed. Its value to the quality of life of the residents can be gauged by the efforts of numerous community groups that have shown interest in this natural resource and are utilizing it recreationally through the creation of bike paths and caring for it through locally led cleanup efforts.

Water Resources Concerns

Increased development in the upper Scajaquada Creek Watershed in recent years has led to decreased base flow in the stream with the expansion of sewer districts and increased extent of impervious surfaces. These changes have also brought about higher peak storm flow discharges and subsequently, higher rates of streambank erosion and downstream sedimentation. Combined and sanitary sewer overflows occur frequently in Scajaquada Creek and introduce excess nutrients and chemicals into the stream, stressing aquatic life.

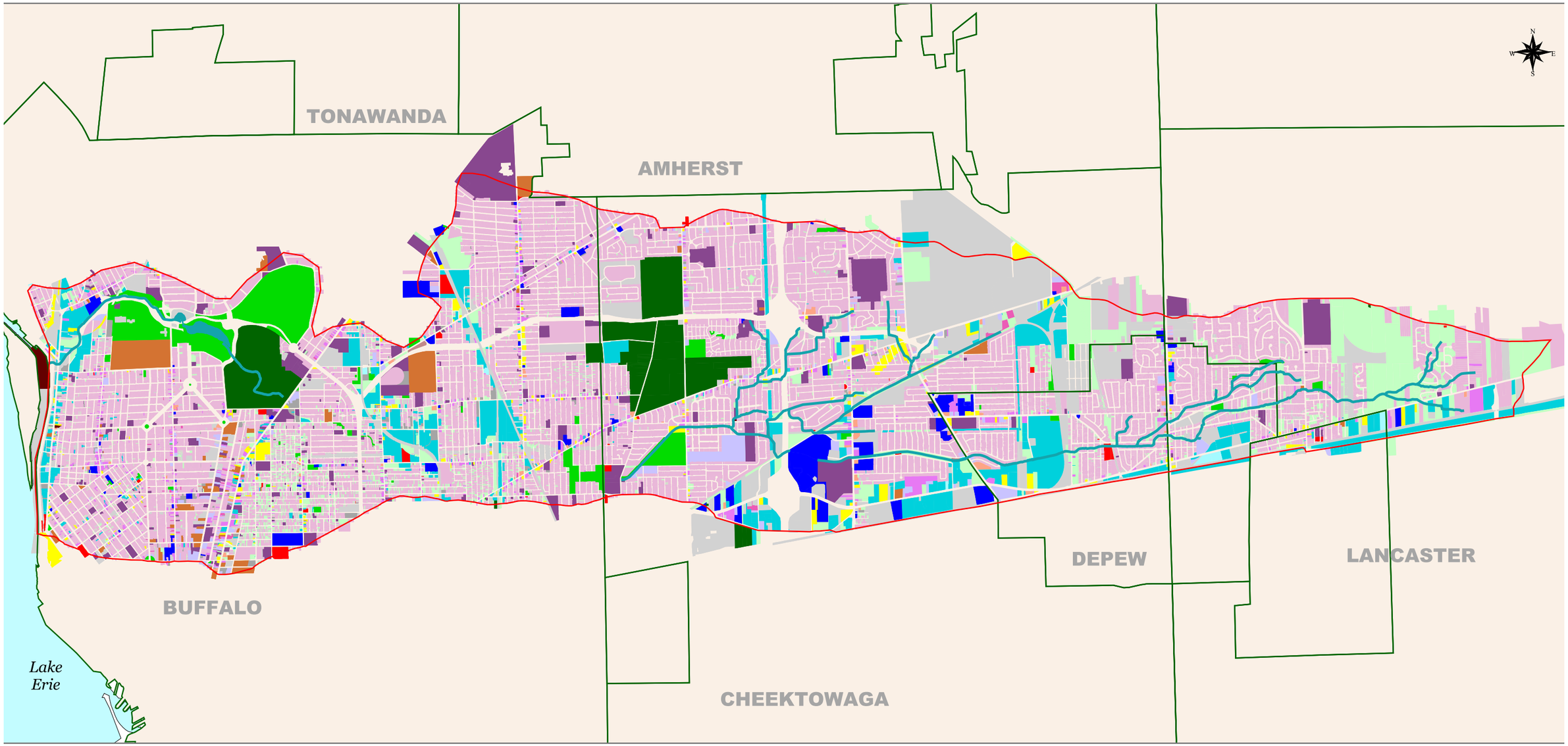
Historically, Scajaquada Creek in Buffalo served as an open sewer until a 3.7-mile section was routed through an underground tunnel in response to health concerns in the 1920s. In the early 1970s the underground portion was tied into the City sewer system, and receives discharge of raw sewage, industrial wastes and overflows from combined and sanitary sewers. In the 1970s and 1980s, Scajaquada Creek was channelized and managed for flood control for nearly four miles in the Town of Cheektowaga in the upper watershed.

In response to citizen concerns about water quality, litter and odor problems in the lower reach of Scajaquada Creek, the Erie County Soil and Water Conservation District received funding from the Erie County Legislature for a two-year project to form the Scajaquada Creek Watershed Advisory Council (SCWAC) and develop a watershed management plan. District Technicians conducted a physical inspection of the entire creek and its major tributaries, except for inside the tunneled sections, in summer 2000. Key concerns identified in the inspection are sewer overflows, erosion and sedimentation, and water quality and quantity. Contaminated sediments and wildlife habitat have also been identified as concerns.

Planning meetings are essential to successful watershed management. Photo by Juliet Wnek

An Evolving Watershed Management Planning Process

The Draft Scajaquada Creek Watershed Management Plan contains most of the information needed for managing water resources, but elected officials, municipal representatives, industry, developers, homeowners and environmental organizations need to work together to make the plan truly effective. The entire watershed community benefits from the cleaner, healthier water resources that result from proper watershed management. Through continued review of the management goals and objectives contained in this Plan, open communication between municipal planners and other stakeholders, and the willingness to pursue new solutions to environmental challenges, we can protect our valuable natural resources for public enjoyment for generations to come.



1 0 1 2 3 Miles

Scajaquada Creek and Tributaries
Scajaquada Creek Watershed
Municipal Boundaries

Land Use Classification

- Not Classified
- Residential
- Hotels / Motels
- Residential - Retail
- Retail / Shopping Plazas
- Office Buildings
- Schools / Churches / Libraries
- Restaurants / Bars
- Hospitals / Health Care Facilities
- Light Industrial
- Industrial
- Vacant Land
- Parks / Museums / Outdoor Sports Facilities
- Cemeteries
- Motor Vehicle Services
- Parking Lots / Parking Garages
- Land Adjoining Roads
- Public Services
- Sewage Treatment Facilities

Scajaquada Creek Watershed Advisory Council
Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

Scajaquada Creek Watershed
Erie County, New York
Land Use

Plate 2

Scajaquada Creek Watershed Advisory Council

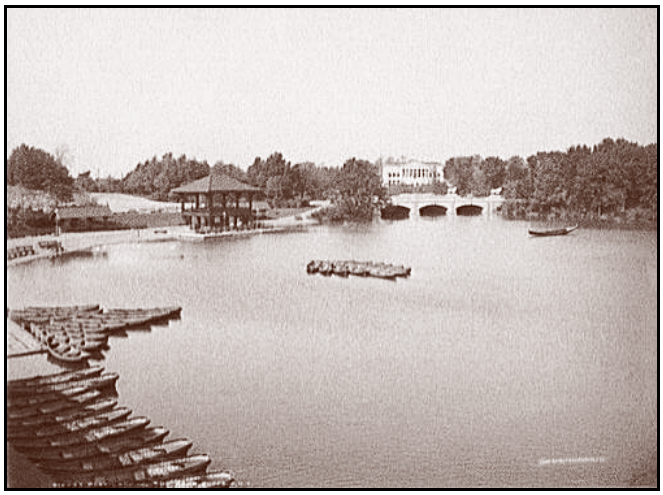
The Scajaquada Creek Watershed Advisory Council is comprised of citizens, businesses, educators, community groups, environmental organizations, technical advisors and municipal and elected officials who gather at monthly stakeholder meetings to coordinate protection and restoration efforts and develop the Scajaquada Creek Watershed Management Plan. The Erie County Soil and Water Conservation District chairs the Advisory Council's Technical Committee. Stakeholders participating in the Watershed Advisory Council include the City of Buffalo Public Works, Buffalo Sewer Authority, the Parkside Greens (a local citizen environmental group), the Village of Depew Public Works, Erie County Department of Environment and Planning, USDA Natural Resources Conservation Service, Partners for Urban Resources and Environment—Erie/ Niagara, Erie County Water Quality Committee, Ecology and Environment, Inc., educators from Buffalo State College, and citizens from Buffalo, Cheektowaga, Depew and Lancaster. Additional stakeholder participation is necessary to ensure the success of the partnership.

SCWAC Stakeholders met in February 2001 to prioritize environmental concerns identified from public opinion surveys . Photo by Juliet Wnek

The Scajaquada Creek Watershed Advisory Council (SCWAC) was formed as a component of a special project begun by the Erie County Soil and Water Conservation District in January 2000, funded by a grant from the Erie County Legislature at the request of Legislator Judith P. Fisher (District 4). Constituents of Ms. Fisher had expressed concern about litter and odor problems in the lower reach of Scajaquada Creek. The Soil and Water Conservation District conducted a physical inspection of the creek and its major tributaries in 2000 and 2001 to identify critical streambank erosion sites and debris snags, and document sewer outfalls. A direct-mail survey of 1200 watershed residences and other stakeholders identified their environmental concerns and provided them an opportunity to express their opinions of the creek and its condition. Over 76% of survey respondents have indicated that water quality and sewer discharges are significant problems, and many have expressed concerns that water quality has prohibited use of the stream for wildlife habitat and recreation. Survey results begin on page 23.

Scajaquada Creek Watershed Advisory Council Mission

The mission of the Scajaquada Creek Watershed Advisory Council is "to develop and implement a community-based Watershed Management Plan to protect, restore and revitalize the Scajaquada Creek watershed, to encourage and support environmental stewardship efforts, and to provide for improved opportunities for public enjoyment of the watershed."



Boat landing and band shell on Delaware Lake, between 1903 and 1906, with Buffalo and Erie County Historical Society building in background. (photo courtesy of the Library of Congress)

Stream History

The Scajaquada Creek watershed is filled with history. The name Scajaquada presumably comes from the Indian name Conjockety or Kenjockety, who was the "last survivor of the ancient Neutral Nation," and lived at Black Rock.

Black Rock, at the mouth of Scajaquada was the site of America's first naval yard in 1812, to fight off the invading British. The Pan-American Exposition took place on the shores of Delaware Park Lake. Forest Lawn Cemetery occupies former farm lands that were once the edge of the city of Buffalo.

Frederick Law Olmsted designed the beautiful Delaware Park in the 1880s, damming Scajaquada to form "Gala Water," known for a time as Delaware Lake, and recently renamed Hoyt Lake after former NYS Assemblyman Sam Hoyt II. The original lake was larger than today's lake, with bays and islands, a boat house and docks. Located at what were the outskirts of Buffalo, the park was crossed by only one city street, Delaware Avenue.

Much of Olmsted's design for Delaware Park was damaged by the use of the grounds for the Pan American Exhibition of 1901. A municipal golf course was established on the meadow. A permanent zoological collection was established, replacing the flock of sheep which had formerly grazed upon the park meadow. A massive intrusion onto Omsted's design occurred about 1960, when an expressway was extended across the park, separating it into two sections and bringing the bustle of the city into the heart of the park. As a part of the construction, significant portions of the park lake were filled.

Recent attempts to restore the Olmsted design have made some progress, but also met with some resistance from competing interests. A great deal remains to be done before Delaware Park and Scajaquada Creek will again reflect the glories of their past.

During the Pan American Exposition, Buffalo was celebrated not only as the City of Light, but the City of Trees. Today, cities across America are discovering what Buffalonians have known for more than a century - quality urban parks, waterways and greenways are vital to a city's quality of life and to its economic success.

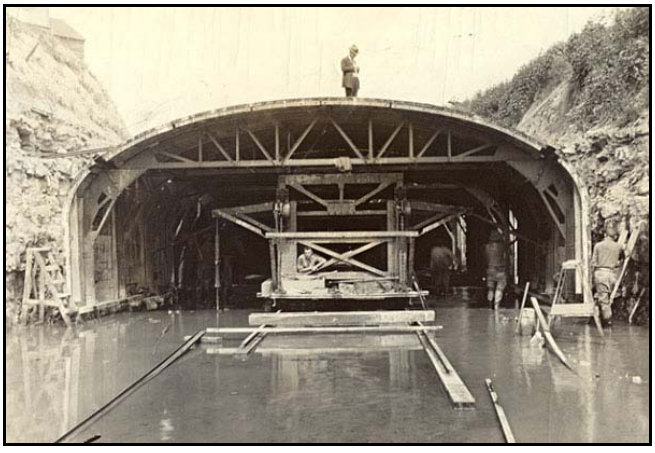
Aerial view of Delaware Lake and North Bay in 1938, before reshaping and construction of the Scajaquada Expressway removed the bays and islands.

Crews at work on the Scajaquada Drain tunnel project, 1923. (photo courtesy of Western NY Heritage Magazine)

Buried Stream

In the 1920s, a $4.5 million project buried nearly four miles of Scajaquada Creek, from Pine Ridge Road to Main Street, in a tunnel 15 feet or more below the surface, and up to 33 feet wide. The tunnel was constructed to improve sanitation and control flooding. Hundreds of residents along the creek had been dumping garbage, dead animals and sewage into the stream for years and the result was a health hazard and eyesore. Bridges over the creek were removed, and filled land over the former creek bed created many "pocket" parks, providing an opportunity for public open space that has been underutilized.

Sewer systems crossing the creek were disconnected in the 1930s, allowing the creek to become a conduit for sewer overflows. Delaware Lake became a serious health risk, and so in 1938 the Delevan Drain was built to divert the combined sewage at Main Street directly to the Bird Island treatment plant. It is designed to allow high flows, such as during storm events, to exit the tunnel and continue flowing down the stream channel through Forest Lawn. Sewage overflows continued to be a concern and water quality in the lake did not improve sufficiently, and a 1950s study by the Erie County Health Department declared the lake a health hazard and it was closed to the public. To protect the lake from the creek's polluting waters, the two were separated in the late 1970s. The creek was rerouted next to the lake in two conduits that outlet west of Lincoln Parkway, where a dam keeps the lake and creek separate in all but high flow situations. Stream velocity slows at the tunnel outlet, and sewage and sediment accumulate in the channel. Water quality in the lake has improved, but it still does not support desirable fish species. The disconnected lake now requires periodic recharge from wells.

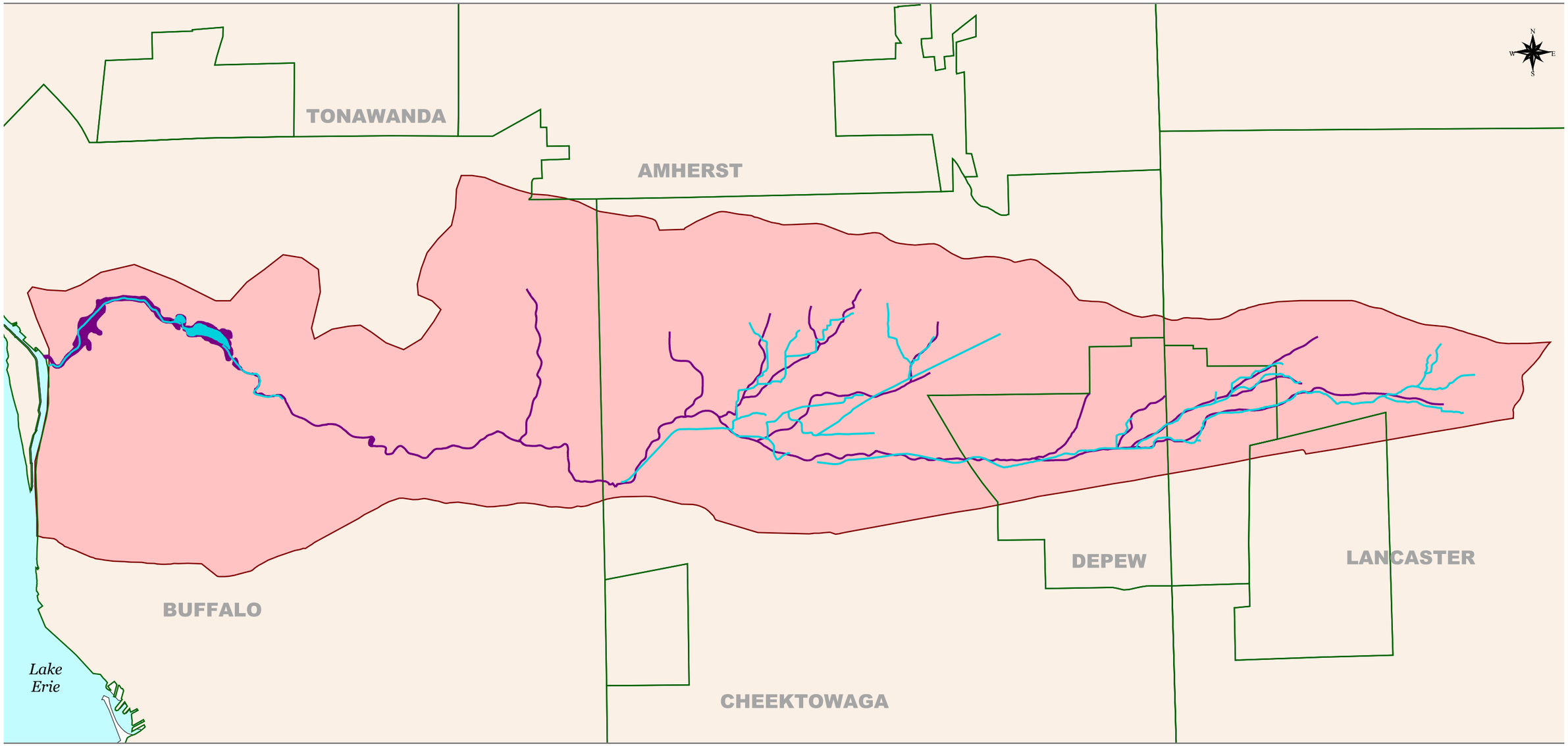


Tunnel supports in place along Scajaquada Creek in 1924. (photo courtesy of WNY Heritage Magazine)

Flooding

Scajaquada Creek flooded in 1937, 1942, 1945, 1946, 1963 and 1967, causing property damage each time. A flood control project, a joint effort by the NYS Department of Environmental Conservation and US Army Corps of Engineers in the mid to late 1970s and early 1980s channelized almost two miles of the main branch and almost three miles of Scajaquada Creek tributaries in Cheektowaga. In the final Environmental Impact Statement the USACE stated that channelization would destroy and disturb the natural terrestrial and aquatic ecosystem, have long-lasting effects upon the environment and encourage further floodplain development. Development did indeed increase, and in the late 1980s the Walden Galleria Mall, along with stormwater detention basins designed for a 500-year storm, were built on the remaining wetland and floodplain acreage in Cheektowaga.

Construction in progress in 1983 on the flood control project near the present-day location of Walden Galleria. (photo courtesy of Edwin Merriman)



1 0 1 2 3 Miles

Scajaquada Creek Watershed Advisory Council
Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

Scajaquada Creek and Tributaries - circa 1900
Scajaquada Creek and Tributaries - 2002
Scajaquada Creek Watershed
Municipal Boundaries

Scajaquada Creek Watershed

Erie County, New York

Stream Channel Changes

Plate 3

TONAWANDA

AMHERST

LANCASTER

DEPEW

CHEEKTOWAGA

BUFFALO

Lake Erie

1 0 1 2 3 Miles

Wetlands - NYS Designated
Wetlands - Federally Designated

100 Yr Floodplain - No Base Flood Elevations Determined
100 Yr Floodplain - Base Flood Elevations Determined
100 Yr Floodplain - Area of Ponding
Floodplain Area Not Included
Undetermined but Possible Flood Hazards
500 Yr Floodplain

Scajaquada Creek and Tributaries
Scajaquada Creek Watershed
Municipal Boundaries

Scajaquada Creek Watershed Advisory Council
Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

Scajaquada Creek Watershed

Erie County, New York

Wetlands and Floodplains

Plate 4

Watershed Geography

The Watershed Concept

A watershed can be described as a catch basin defined by geographic boundary that determines which way surface water will flow. All precipitation that falls on the land within that boundary drains to a particular body of water or common point.

A Pictorial Watershed Tour

The headwaters of Scajaquada Creek are on the east side of Stony Road in the Town of Lancaster. The stream is directed through a series of culverts, drainage pipes and wet retention basins flowing west through several new residential

Looking east at Traceway Drive in Lancaster.

developments north of Walden Avenue. The stream channel has been straightened through many areas of the Village of Depew and the Town of Cheektowaga, and the banks have been reinforced with concrete block walls in several locations. Some of the older homes along these walled sections are close to the stream but do not appear to be under immediate threat from flooding or erosion.

A tributary meets Scajaquada Creek near George Urban Blvd in Depew.

A flood control project and Town Park along North Creek and South Creek Roads in Cheektowaga provides recreational opportunities as well as wildlife habitat along the stream corridor.

Flood control project between North Creek and South Creek Roads in Cheektowaga.

Photo by Dr. Shreeram Inamdar

Scajaquada Creek enters an underground passage at the east side of the Walden Galleria Mall then emerges on the northwest side of the shopping center where the stream follows a U.S. Army Corps of Engineers/NYS Department of Environmental Conservation/Town of Cheektowaga flood control project constructed with concrete and riprap along some of the banks.

Tunnel entrance at the east side of Walden Galleria.

Photo by Dr. Shreeram Inamdar

Looking east toward NYS Thruway at Army Corps of Engineers/NYS Department of Environmental Conservation flood control project in Cheektowaga.

A series of detention basins downstream of the New York State Thruway overpass were designed to capture a 500-year storm event as part of the impact mitigation associated with the construction of Walden Galleria. Cheektowaga Town Park just west of Harlem Road on the banks of Scajaquada Creek is a favorite stopping point for ducks, geese and other wildlife.

Scajaquada Creek tunnel exit at Forest Lawn. The sewer discharge pipe is at left in the tunnel.

Photo by Susan Eck

At Pine Ridge Road across from Villa Maria College, the stream enters a large tunnel, passing under city streets for nearly four miles, then re-emerges at the eastern edge of Forest Lawn Cemetery on Main Street in the City of Buffalo. The stream meanders through the cemetery with block walls guiding the flow for most of the reach.

The sill and "finger" dam east of Grant Street, February 2001 (Buffalo State College at rear).

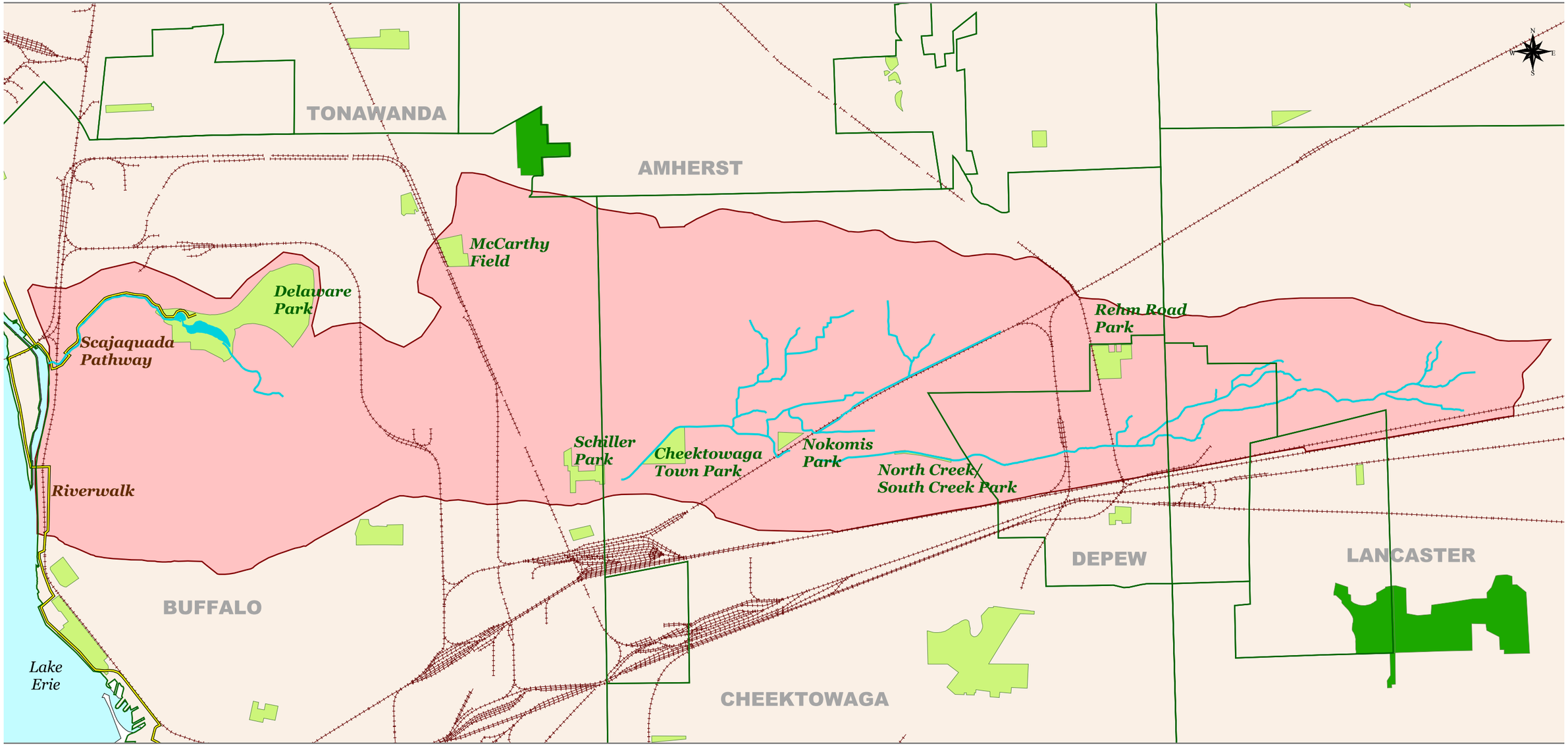
After the stream exits Forest Lawn it enters a short tunnel to bypass Hoyt Lake in Delaware Park. A debris-collecting grate lies at the entrance to the tunnel. Scajaquada Creek reemerges at the western end of Hoyt Lake, where it accepts overflow from the lake at high water levels.

Across from Buffalo State College the channel widens, where a sill and "finger" dam intercept vegetative debris and other waste from upstream. The sill also keeps the Black Rock Canal from backing up too far into Scajaquada Creek during periods of high flows from Lake Erie or strong westerly winds. From Delaware Park to the mouth the stream flows through an industrialized area, but the land immediately along the stream banks has not been developed for much of the reach, although the land has been disturbed. This section of Scajaquada Creek is home to many species of birds and other wildlife and is included in the "Niagara River Globally Significant Important Bird Area."

The Scajaquada Pathway provides walkers, joggers and cyclists with recreation and fitness opportunities as well as a scenic view.

A recreational path follows the creek from Delaware Park to Tonawanda Street near the stream terminus at the Black Rock Canal, where it joins the Riverwalk along the Niagara River. The Black Rock Canal flows into the Niagara River and on to Lake Ontario.

Debris in Black Rock Canal at the mouth of Scajaquada Creek. Reversed currents often push debris upstream into Scajaquada.



1 0 1 2 3 Miles

Scajaquada Creek Watershed Advisory Council
Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

- Pathways
- Railways
- Municipal Park
- County Park
- Scajaquada Creek and Tributaries
- Scajaquada Creek Watershed
- Municipal Boundaries

Scajaquada Creek Watershed

Erie County, New York

Recreational Opportunities

Plate 5

Physical Characteristics

Geology

The Niagara Region is located on a portion of a great plain which runs east to west from the northern Laurentian Highlands (Canadian Shield) approximately 100 miles north of Toronto, Ontario to the southern Allegheny Plateau, which forms the foothills of the Adirondack Mountains and the Appalachian Mountains. The plain is a small part of the Great Lakes lowlands in which Lake Superior, Lake Michigan, Lake Huron, Lake Erie and Lake Ontario lie.

The Middle Devonian Period began about 390 million years ago. In New York, the Middle Devonian is easily recognizable as it sits directly atop a major unconformity (disconformity). This occurred when a drop in the sea level exposed the Bois Blanc Formation to the air. Subsequent erosion removed a large chunk of Early Devonian history missing from the geologic record. As the sea level rose, western New York was covered with a blanket of clean carbonate limestone of the Onondaga Formation. The reefs and limestones found in the Onondaga indicate a warm and shallow sea.

Most of the Scajaquada Creek watershed is composed of bedrock from the Middle Devonian, from Lancaster to Main Street in Buffalo, where the stream cascades over the Onondaga Escarpment and continues to the Black Rock Canal over the Bertie Formation dolostone and shale of the Upper Silurian formed over 400 million years ago.

Scajaquada Creek flows over the Onondaga Escarpment just west of Main Street at Serenity Falls in Forest Lawn Cemetery.

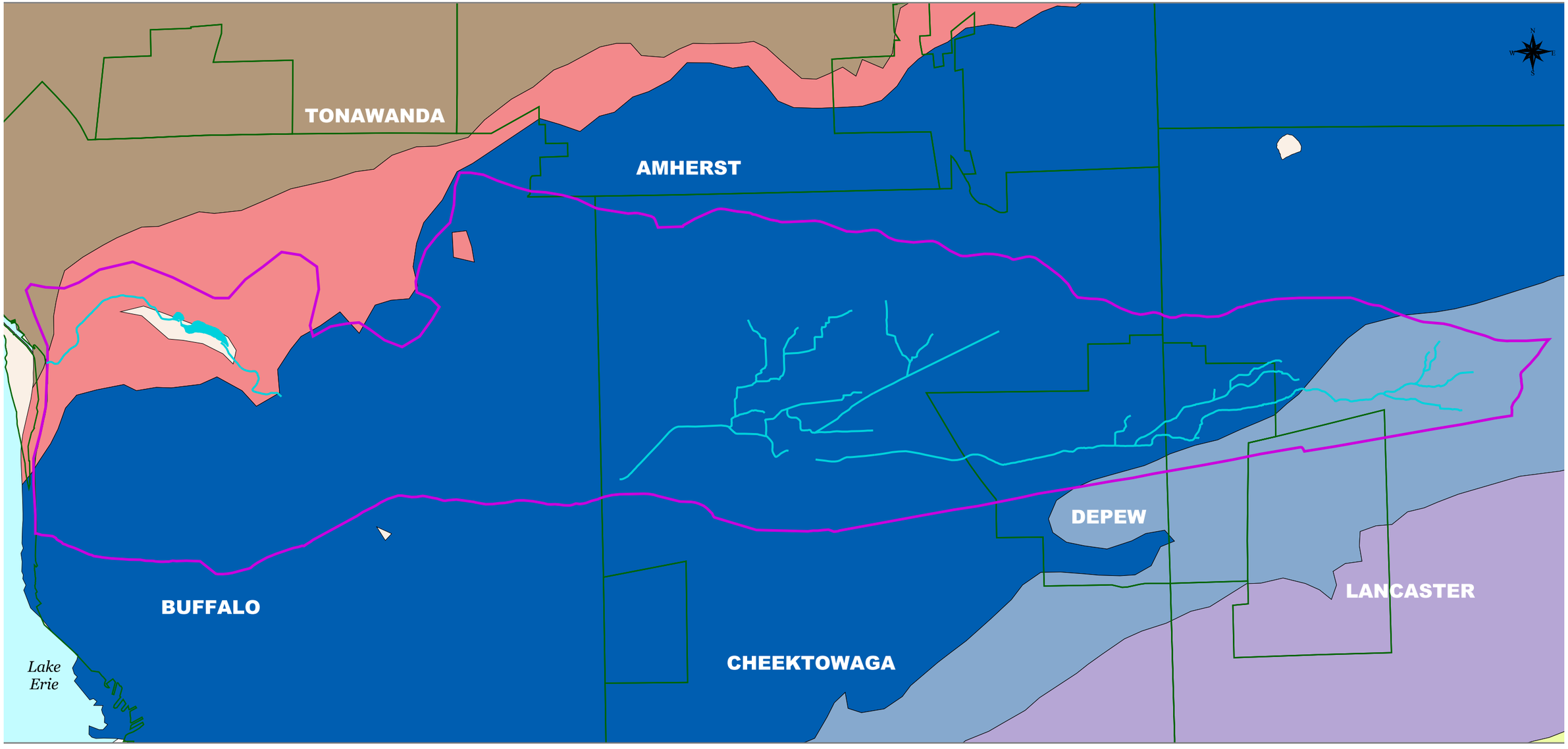
Soils and Topography

The southern watershed boundary and eastern portion of the northern boundary are on low glacial till moraines, primarily comprised of Ovid silt loam soils. The lower-lying central portion of the watershed is made up of lacustrine soils, with large areas of Odessa and Lakemont silty clay loams. The soils are poorly or somewhat poorly drained and have a seasonally high water table. Much of the soils have been disturbed for development, and are now classified as Urban soils, but small areas of undisturbed soils described as having "potential for hydric inclusions" indicate that the watershed may have had many acres of wetlands. The Erie County Soil Survey in 1986 mapped several miles of Wayland and Lakemont soils, both wetland soils, along riparian corridors of the main branch and tributaries. Small pockets of wetlands still exist, especially near Walden Galleria and north of Walden Avenue in the Town of Lancaster.

Scajaquada Creek falls only just over 100 feet in elevation over its seventeen-mile course from Lancaster to Black Rock. Serenity Falls on Scajaquada Creek at Forest Lawn Cemetery is the only waterfall in the City of Buffalo. Topography throughout the watershed is relatively flat, with small gently sloping hills typical of glacial moraine deposits occurring mainly along the watershed boundaries.

Climate

The Scajaquada Creek watershed experiences a fairly humid, continental-type climate, with moderate summers and cool winters. The climate is highly variable, and extreme or rapid weather changes can occur. Precipitation averages 40 inches per year and is strongly influenced by air masses moving over Lake Erie, producing "lake effect" snows in winter. Temperatures in Buffalo, in the western portion of the watershed, can often be 10 degrees cooler than the inland eastern watershed due to the cooling influence of the lake. Summer humidity levels are moderate, and temperatures rise above 90º Fahrenheit usually only three times per year. Thunderstorms occur most often at night, and are more frequent in August. The mean annual temperature is 45.9º Fahrenheit, ranging from 23.2º Fahrenheit in February to 68.4º Fahrenheit in July.



1 0 1 2 3 Miles

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Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

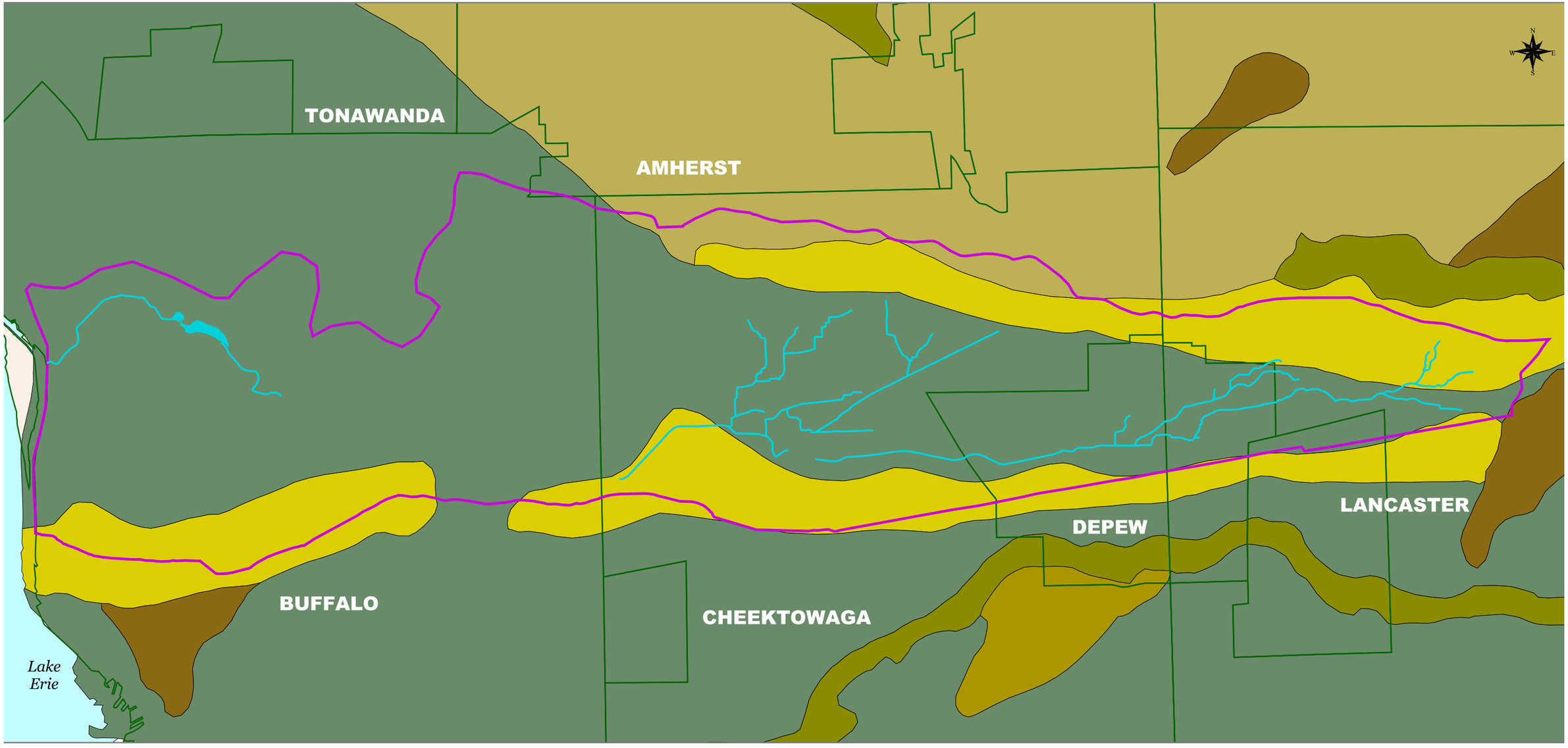
- Camillus, Syracuse, & Vernon Formations--shale, dolostone, salt, and gypsum
  Upper Silurian
- Akron Dolostone; Bertie Formation--dolostone, shale
  Upper Silurian
- Seneca, Morehouse (cherty), & Clarence Limestone Member, local coral bioherms; Bois Blanc Formation--sandy, thin, discontinuous
  Middle Devonian
- Marcellus Formation--Oatka Creek Shale Member
  Middle Devonian
- Skaneateles Formation--Levanna Shale, Stafford Limestone Members
  Middle Devonian
- Ludlowville Formation--Deep Run Shale, Tichenor Limestone, Wanakah & Ledyard Shales, Centerfield Limestone Members
  Middle Devonian
- Scajaquada Creek and Tributaries
- Scajaquada Creek Watershed
- Municipal Boundaries

Scajaquada Creek Watershed

Erie County, New York

Bedrock Geology

Plate 6



1 0 1 2 3 Miles

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Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

- Lacustrine sand
- Lacustrine silt & clay
- Outwash sand & gravel
- Recent deposits
- Till
- Till moraine
- Scajaquada Creek and Tributaries
- Scajaquada Creek Watershed
- Municipal Boundaries

Scajaquada Creek Watershed

Erie County, New York

Surficial Geology

Plate 7

Environmental Regulations

Environmental regulations often place limitations on the design and execution of many infrastructure improvements, but many of these laws and rules also provide avenues to funding sources to implement natural resources management practices that improve the quality of life for our communities.

Following are brief descriptions of some of the regulations governing watershed management. Municipalities are required to comply with these regulations when planning for new development, maintaining and upgrading stormwater and water supply infrastructure, and providing public services such as snow removal, street cleaning, wastewater treatment, solid waste disposal, and other services.

Clean Water Act

Growing public awareness and concern for controlling water pollution led to enactment of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act. The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. It gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry. The Clean Water Act also continued requirements to set water quality standards for all contaminants in surface waters. The Clean Water Act (CWA) provides that no person may discharge a pollutant into navigable waters except in compliance with a permit issued under section 402 of the Act. A "discharge" is defined as "any addition of any pollutant to navigable waters from any point source." The term "pollutant" is broadly defined in the CWA and includes industrial waste, animal wastes and other materials. The term "point source" as defined in the CWA includes any "discernible, confined and discrete conveyance."

It also funded the construction of sewage treatment plants under the construction grants program and recognized the need for planning to address the critical problems posed by nonpoint source pollution.

Subsequent enactments modified some of the earlier Clean Water Act provisions. Revisions in 1981 streamlined the municipal construction grants process, improving the capabilities of treatment plants built under the program. Changes in 1987 phased out the construction grants program, replacing it with the State Water Pollution Control Revolving Fund, more commonly known as the Clean Water State Revolving Fund. This new funding strategy addressed water quality needs by building on EPA-State partnerships.

The CWA has provisions for the delegation by USEPA of many permitting, administrative and enforcement aspects of the law to state governments. In states with the authority to implement CWA programs, USEPA still retains oversight responsibilities. Section 118 applies specifically to the Great Lakes.

NPDES

Water pollution degrades surface waters making them unsafe for drinking, fishing, swimming, and other activities. As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or human-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states. Since its introduction in 1972, the NPDES permit program has resulted in significant improvements to our Nation's water quality.

SPDES

The Clean Water Act also identified the types of activities that needed authorization for the discharge of pollutants to the nation's waterways and established a hierarchy of standards and deadlines that the discharger had to meet.

The 1987 CWA amendments specifically identified the types of stormwater discharges requiring permit authorization and established deadlines for their achievement. Each State, including New York, administers its State Pollutant Discharge Elimination System (SPDES) program which serves as the authorizing mechanism for activities in the State to comply with the NPDES program.

Whenever someone discharges to a "Water of New York State," they first need authorization to do so, which usually is accomplished by obtaining a SPDES permit from the New York State Department of Environmental Conservation. This permit contains provisions under which the discharge is allowed to occur. A SPDES permit also satisfies the federal NPDES requirements since the DEC has an approved NPDES program which is administered in lieu of the EPA issuing NPDES permits in New York State.

Storm Water Phase II Final Rule

The Phase II Final Rule requires NPDES permit coverage for storm water discharges from:

- Certain regulated small municipal separate storm sewer systems (MS4s); and
- Construction activity disturbing between 1 and 5 acres of land (i.e., small construction activities).

In addition to expanding the NPDES Storm Water Program, the Phase II Final Rule revises the "no exposure" exclusion and the temporary exemption for certain industrial facilities under Phase I of the NPDES Storm Water Program.

Twenty-three MS4s in Erie County, including all of Scajaquada Creek watershed, must obtain coverage under the NPDES general permit by March 10, 2003. Regulated

MS4s must develop and enforce stormwater management plans to reduce pollutant discharges to the "maximum extent practicable," and include six minimum control measures: public education and outreach; public participation/ involvement; illicit discharge detection and elimination; construction site runoff control; post-construction runoff control; and pollution prevention/good housekeeping.

More information on the Storm Water Phase II Final Rule can be found on page 13 or at http://cfpub.epa.gov/npdes/stormwater/swphase2.cfm

Coastal Zone Management Act

The National Coastal Management Program is a federal-state partnership dedicated to comprehensive management of the nation's coastal resources, ensuring their protection for future generations while balancing competing national economic, cultural and environmental interests.

The Coastal Zone Management Program (CZMP) is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the Coastal Programs Division (CPD) within the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management (OCRM). The CPD is responsible for advancing national coastal management objectives and maintaining and strengthening state and territorial coastal management capabilities. It supports states through financial assistance, mediation, technical services and information, and participation in priority state, regional, and local forums.

The CZMP's leaves day-to-day management decisions at the state level in the 34 states and territories with federally approved coastal management programs. Currently, 95,376 national shoreline miles (99.9%) are managed by the Program. State and federal coastal zone management efforts are guided by the CZMP's Strategic Framework, which is organized around three major themes: Sustain Coastal Communities, Sustain Coastal Ecosystems, and Improve Government Efficiency. In New York State, the Department of State is responsible for administering the CZMP.

Great Lakes Strategy

As the largest freshwater system on the face of the earth, the Great Lakes ecosystem holds the key to the quality of life and economic prosperity for tens of millions of people. While significant progress has been made to restore the environmental health of the Great Lakes, much work remains to be done. Chemical or biological contaminants still limit our ability to eat the fish we catch, prevent us from swimming at our public beaches, and can make us vulnerable to health problems. Natural areas have been degraded, and the diversity of our fish and wildlife populations is increasingly threatened. The U.S. Policy Committee has developed the Great Lakes Strategy 2002 to advance Great Lakes protection and restoration efforts in the new millennium.

Great Lakes Strategy 2002 was created by the U.S. Policy Committee – a forum of senior-level representatives from the Federal, State, and Tribal agencies responsible for environmental and natural resources management of the Great Lakes – to help coordinate and streamline efforts of the many governmental partners involved with protecting the Great Lakes. The Strategy focuses on multi-Lake and basin-wide environmental issues and establishes common goals that the governmental partners will work toward. It supports existing efforts underway, including Lakewide Management Plans and Remedial Action Plans for Areas of Concern, by addressing issues that are beyond the scope of these programs and helping integrate them into an overall basinwide context. It also advances the implementation of the United States' responsibilities under the Great Lakes Water Quality Agreement of l987.

Together with local governments, industry, non-governmental environmental organizations, and the general public, the U.S. Policy Committee developed a shared, long-range vision for the Great Lakes:

The VISION –

- The Great Lakes Basin is a healthy natural environment for wildlife and people.
- All Great Lakes beaches are open for swimming.
- All Great Lakes fish are safe to eat.
- The Great Lakes are protected as a safe source of drinking water.

In support of this vision, the member agencies of the U.S. Policy Committee commit to work together to "protect and restore the chemical, physical, and biological integrity of the Great Lakes Basin Ecosystem." The Strategy sets forth specific objectives and actions that will reduce contaminants, restore habitat, and protect the living resources of the basin.

Niagara River Declaration of Intent

Signed in February 1987 by Environment Canada, USEPA, NYSDEC and Ontario Ministry of Environment, the Niagara River Declaration of Intent committed the Four Parties to work toward reducing the amount of toxic contaminants in the Niagara River through implementation of the Niagara River Toxic Management Plan (NRTMP). It also committed the agencies to the development of a Lake Ontario Toxics Management Plan (LOTMP). This was in response to an identified toxics problem in the Niagara River and Lake Ontario.

United States Environmental Protection Agency | Office of Water (4203) | EPA 833-F-00-001 January 2000 Fact Sheet 1.0

Storm Water Phase II Final Rule

An Overview

Storm Water Phase II Final Rule Fact Sheet Series

Why Is the Phase II Storm Water Program Necessary?

Since the passage of the Clean Water Act (CWA), the quality of our Nation's waters has improved dramatically. Despite this progress, however, degraded waterbodies still exist. According to the 1996 National Water Quality Inventory (Inventory), a biennial summary of State surveys of water quality, approximately 40 percent of surveyed U.S. waterbodies are still impaired by pollution and do not meet water quality standards. A leading source of this impairment is polluted runoff. In fact, according to the Inventory, 13 percent of impaired rivers, 21 percent of impaired lake acres and 45 percent of impaired estuaries are affected by urban/suburban storm water runoff and 6 percent of impaired rivers, 11 percent of impaired lake acres and 11 percent of impaired estuaries are affected by construction site discharges.

Phase I of the U.S. Environmental Protection Agency's (EPA) storm water program was promulgated in 1990 under the CWA. Phase I relies on National Pollutant Discharge Elimination System (NPDES) permit coverage to address storm water runoff from: (1) "medium" and "large" municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater, (2) construction activity disturbing 5 acres of land or greater, and (3) ten categories of industrial activity.

The Storm Water Phase II Final Rule is the next step in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted storm water runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. See Fact Sheets 2.0 and 3.0 for overviews of the Phase II programs for MS4s and construction activity.

Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges that have the greatest likelihood of causing continued environmental degradation. The environmental problems associated with discharges from MS4s in urbanized areas and discharges resulting from construction activity are outlined below.

MS4s in Urbanized Areas

Storm water discharges from MS4s in urbanized areas are a concern because of the high concentration of pollutants found in these discharges. Concentrated development in urbanized areas substantially increases impervious surfaces, such as city streets, driveways, parking lots, and sidewalks, on which pollutants from concentrated human activities settle and remain until a storm event washes them into nearby storm drains. Common pollutants include pesticides, fertilizers, oils, salt, litter and other debris, and sediment. Another concern is the possible illicit connections of sanitary sewers, which can result in fecal coliform bacteria entering the storm sewer system. Storm water runoff picks up and transports these and other harmful pollutants then discharges them – untreated – to waterways via storm sewer systems. When left uncontrolled, these discharges can result in fish kills, the destruction of spawning and wildlife habitats, a loss in aesthetic value, and contamination of drinking water supplies and recreational waterways that can threaten public health.

Construction Activity

Uncontrolled runoff from construction sites is a water quality concern because of the devastating effects that sedimentation can have on local waterbodies, particularly small streams. Numerous studies have shown that the amount of sediment transported by storm water runoff from construction sites with no controls is significantly greater than from sites with controls. In addition to sediment, construction activities yield pollutants such as pesticides, petroleum products, construction chemicals, solvents, asphalts, and acids that can contaminate storm water runoff. During storms, construction sites may be the source of sediment-laden runoff, which can overwhelm a small stream channel's capacity, resulting in streambed scour, streambank erosion, and destruction of near-stream vegetative cover. Where left uncontrolled, sediment-laden runoff has been shown to result in the loss of in-stream habitats for fish and other aquatic species, an increased difficulty in filtering drinking water, the loss of drinking water reservoir storage capacity, and negative impacts on the navigational capacity of waterways.

Are Municipally Operated Sources Exempted by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 Affected by the Final Rule?

Provisions within ISTEA temporarily delayed the deadline for Phase I industrial activities (with the exception of power plants, airports, and uncontrolled sanitary landfills) operated by municipalities with populations of less than 100,000 people to obtain an NPDES storm water discharge permit. Congress delayed the permitting deadline for these facilities to allow small municipalities additional time to comply with NPDES requirements. The Phase II Final Rule ended this temporary exemption from permitting and set a deadline of no later than March 10, 2003 for all ISTEA-exempted municipally operated industrial activities to obtain permit coverage.

How Was the Phase II Final Rule Developed?

EPA developed the Phase II Final Rule during extensive consultations with a cross-section of interested stakeholders brought together on a subcommittee chartered under the Federal Advisory Committee Act, and with representatives of small entities participating in an advisory process mandated under the Small Business Regulatory Enforcement Fairness Act. In addition, EPA considered comments submitted by over 500 individuals and organizations during a 90-day public comment period on the proposed rule.

Why Does Part of the Phase II Final Rule Use a Question and Answer Format?

The provisions pertaining to operators of small MS4s are written in a "readable regulation" form that uses the "plain language" method. Questions and answers are used to create more reader-friendly and understandable regulations. The plain language method uses "must" instead of "shall" to indicate a requirement and words like "should," "could," or "encourage" to indicate a recommendation or guidance.

Who Is Covered by the Phase II Final Rule?

The final rule "automatically" covers two classes of storm water dischargers on a nationwide basis:

(1) Operators of small MS4s located in "urbanized areas" as delineated by the Bureau of the Census. A "small" MS4 is any MS4 not already covered by Phase I of the NPDES storm water program. See Fact Sheets 2.1 and 2.2 for more information on small MS4 coverage.

(2) Operators of small construction activities that disturb equal to or greater than 1 (one) and less than 5 (five) acres of land. See Fact Sheet 3.0 for more information on small construction activity coverage.

Waivers

Permitting authorities may waive "automatically designated" Phase II dischargers if the dischargers meet the necessary criteria. See Fact Sheets 2.1 (small MS4 waivers overview), 3.0 (construction waivers overview) and 3.1 (construction rainfall erosivity waiver) for details.

Phased-in Permit Coverage

Permitting authorities may phase-in permit coverage for small MS4s serving jurisdictions with a population under 10,000 on a schedule consistent with a State watershed permitting approach.

Additional Designations by the Permitting Authority

Small MS4s located outside of urbanized areas, construction activity disturbing less than 1 acre, and any other storm water discharges can be designated for coverage if the NPDES permitting authority or EPA determines that storm water controls are necessary. See Fact Sheet 2.1 for more information on the designation of small MS4s located outside of urbanized areas.

What Does the Phase II Final Rule Require?

Operators of Phase II-designated small MS4s and small construction activity are required to apply for NPDES permit coverage, most likely under a general rather than individual permit, and to implement storm water discharge management controls (known as "best management practices" (BMPs)). Specific requirements for each type of discharge are listed below.

Small MS4s

- A regulated small MS4 operator must develop, implement, and enforce a storm water management program designed to reduce the discharge of pollutants from their MS4 to the "maximum extent practicable," to protect water quality, and to satisfy the appropriate water quality requirements of the CWA. The rule assumes the use of narrative, rather than numeric, effluent limitations requiring implementation of BMPs.
- The small MS4 storm water management program must include the following six minimum control measures: public education and outreach; public participation/involvement; illicit discharge detection and elimination; construction site runoff control; post-construction runoff control; and pollution prevention/good housekeeping. See Fact Sheets 2.3 through 2.8 for more information on each measure, including BMPs and measurable goals.
- A regulated small MS4 operator must identify its selection of BMPs and measurable goals for each minimum measure in the permit application. The evaluation and assessment of those chosen BMPs and measurable goals must be included in periodic reports to the NPDES permitting authority. See Fact Sheet 2.9 for more information on permitting and reporting.

Small Construction Activity

- The specific requirements for storm water controls on small construction activity will be defined by the NPDES permitting authority on a State-by-State basis.
- EPA expects that the NPDES permitting authorities will use their existing Phase I general permits for large construction activity as a guide for their Phase II permits for small construction activity. If this occurs, a storm water pollution prevention plan will likely be required for small construction activity. See Fact Sheet 3.0 for more information on potential program requirements and appropriate BMPs for small construction activity.

What Is the Phase II Program Approach?

The Phase II program, based on the use of federally enforceable NPDES permits:

- Encourages the use of general permits;
- Provides flexibility for regulated operators to determine the most appropriate storm water controls;
- Allows for the recognition and inclusion of existing NPDES and non-NPDES storm water programs in Phase II permits;
- Includes public education and participation efforts as primary elements of the small MS4 program;
- Attempts to facilitate and promote watershed planning and to implement the storm water program on a watershed basis; and
- Works toward a unified and comprehensive NPDES storm water program with Phase I of the program.

How Does the Phase II Final Rule Address the Phase I Industrial "No Exposure" Provision?

In addition to establishing a deadline for ISTEA facilities and designating two new classes of dischargers, the Phase II Final Rule revises the "no exposure" provision originally included in the 1990 regulations for Phase I of the NPDES storm water program. The provision was remanded to EPA for further rulemaking and, subsequently, included in its revised form in the Phase II rule.

Under the Phase II Final Rule, a conditional no exposure exclusion is available to operators of *all* categories of Phase I regulated industrial activity (except category (x) construction activity) who can certify that all industrial materials and activities are protected by a storm resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff. To obtain the no exposure exclusion, written certification must be submitted to the NPDES permitting authority. The final rule includes a *No Exposure Certification* form for use only by operators of industrial activity in areas where EPA is the NPDES permitting authority. See Fact Sheet 4.0 for more information on the conditional no exposure exclusion for industrial activity.

What Is the Phase II Program Implementation "Tool Box?"

EPA is committed to providing tools to facilitate implementation of the final Phase II storm water program in an effective and cost-efficient manner. The "tool box" will include the following components:

- ✏ Fact Sheets;
- ✏ Guidance Documents;
- ✏ Menu of BMPs;
- ✏ Information Clearinghouse/Web Site;
- ✏ Training and Outreach Efforts;
- ✏ Technical Research;
- ✏ Support for Demonstration Projects; and
- ✏ Compliance Monitoring/Assistance Tools.

A preliminary working toolbox is available on EPA's web site at www.epa.gov/owm/sw/toolbox. Three years after publication of the final rule, when the general permits are issued, a fully operational tool box is scheduled to be available.

What Is the Schedule for the Phase II Rule?

- ❑ The Phase II Final Rule was published in the *Federal Register* on December 8, 1999 (64 *FR* 68722).
- ❑ The Conditional No Exposure Exclusion option is available February 7, 2000, in States where EPA is the permitting authority.
- ❑ The NPDES permitting authority will issue general permits for Phase II-designated small MS4s and small construction activity by December 9, 2002.
- ❑ Operators of Phase II "automatically" designated regulated small MS4s and small construction activity must obtain permit coverage within 90 days of permit issuance.
- ❑ The NPDES permitting authority may phase-in coverage for small MS4s serving jurisdictions with a population under 10,000 on a schedule consistent with a State watershed permitting approach.
- ❑ Operators of regulated small MS4s must fully implement their storm water management programs by the end of the first permit term, typically a 5-year period.

For Additional Information

Contacts

☞ U.S. EPA Office of Wastewater Management
- Internet: www.epa.gov/npdes/stormwater
- Phone: 202-564-9545

☞ Your NPDES Permitting Authority. A list of names and telephone numbers for each EPA Region and State is located at: www.epa.gov/npdes/stormwater, then click on "Contacts."

Reference Documents

☞ Storm Water Phase II Final Rule Fact Sheet Series
- Internet: cfpub.epa.gov/npdes/stormwater/swfinal.cfm

☞ Storm Water Phase II Final Rule (64 *FR* 68722)
- Internet: www.epa.gov/npdes/regulations/phase2.pdf

Water Resource Impairments

The New York State Department of Environmental Conservation 1996 Priority Waterbodies List designates Scajaquada Creek as a class B stream (protected for contact recreation) and identifies the primary use impairments as bathing, fishing, fish propagation and survival, and aesthetics. The pollutants are listed as sediment, aesthetics, nutrients, salts, pathogens, thermal changes, organics, oxygen demand, and water level/flow. Sources of pollutants are contaminated sediments, combined sewer overflows, storm sewers, streambank erosion, hydromodification, land disposal, construction, and chemical leaks and spills. A Priority Waterbodies List update is scheduled to be released in 2003. The 1996 listing for Scajaquada Creek can be found on page 19.

Scajaquada Creek is a major contributor of pollutants to the Niagara River, a Great Lakes "Area of Concern" as defined in the Lake Ontario Lakewide Management Plan (LaMP), and is listed as a high priority stream on the Erie County Water Quality Coordinating Committee's Water Quality Strategy. For more information on the LaMP see: www.epa.gov/glnpo/lakeont/.

Some of the pollutants presenting the greatest threats to Scajaquada Creek are discussed below.

Upstream bank erosion contributes tons of sediment annually to the stream and impairs fish habitat.

Sediment Accumulation and Dredging

Lack of flushing and circulation in Hoyt Lake, and a decrease in stream velocity at the outlet of the lake by-pass has lead to sediment deposition in both waterbodies. Sediments at the by-pass conduit outfall include high concentrations of sewage, while lake sediments may contain high concentrations of heavy metals and organic matter. Water quality at both locations is hazardous to aquatic species survival and propagation.

Sediments from upstream bank erosion accumulate in the creek and Hoyt Lake, degrading water quality and stressing fish. Aggressive streambank erosion control through bio-engineering and traditional rock armoring is needed to reduce sediment transport. Elimination of sewage inputs to the stream, from the upper watershed as well as inputs within the tunnel, is a crucial management strategy to improve water quality and lengthen the schedule for dredging.

Sediment remediation took place in 1999 to remove coal tar sludge on National Fuel Gas property under the Scajaquada Expressway. Many tons of contaminated sediment still remain at several sites downstream of Delaware Park.

Nutrients, Salts and Thermal Pollution

Many of the pollutants found in Scajaquada Creek enter through stormwater and direct runoff. Fertilizers and pesticides applied to streamside properties often run off or leach directly into the stream. Fertilizers and grass clippings leaching into the stream increase nutrient levels in the water supply, which cause excess algae blooms, depleting dissolved oxygen in the stream. Common household pesticides such as glyphosate and chlorpyrifos are toxic to avian and aquatic species.

Stormwater runoff from driveways, parking lots, rooftops and streets contains animal waste, road salts, oil, chemicals, fertilizer, yard waste, soil particulates and litter, flowing untreated into the stream. Stormwater is often much warmer than natural stream flow from contact with heated surfaces, further degrading aquatic habitat.

Pathogens

A continuing problem in Scajaquada Creek is the frequent flushing of CSOs (combined sewer overflows) upstream of Forest Lawn and the resulting degradation of water quality and sludge buildup. Botulism bacteria feed on organic waste material, and invertebrates such as snails and maggots concentrate the bacteria and botulism toxin. Ducks and geese eat the invertebrates and become sick and die from the toxin. Scajaquada Creek is contaminated with Type C Botulism, which is fatal to birds, waterfowl and some other wildlife, but not harmful to humans. Dogs and cats are considered resistant.

A dying mallard duck in Scajaquada Creek exhibits "limber neck," a symptom of Type C Avian Botulism.

Photo by Pat Goodwin

Botulism outbreaks have been observed in Scajaquada Creek for at least 20 years. This is an unusually long period and is associated with sewage discharges. Botulism outbreaks can also be associated with stream draw down, as occurs in summer months in Scajaquada Creek. The Scajaquada Drain drop-structure, inside the tunnel near Main Street, allows normal sewer flows (up to 700 cubic feet per second) to discharge directly to the treatment plant on Squaw Island. The structure becomes clogged and sewage overflows into Scajaquada Creek at Forest Lawn. The creek discharges to a by-pass tunnel around Hoyt Lake just west of Delaware Avenue. The by-pass section is a major waterfowl mortality area from botulism, and a highly visible public area.

The public should be discouraged from feeding waterfowl along Scajaquada Creek, especially in public areas such as Delaware Park, Forest Lawn and Cheektowaga Town Park. Eliminating feeding will reduce waterfowl populations and minimize excess nutrient inputs to the stream from wildlife.

PCB Contamination

During September 1996, basically for the first time, NYS DEC collected young-of-year (yoy) fish for contaminant monitoring from upstream locations in 14 Lake Ontario tributaries and two Niagara River tributaries, including Scajaquada Creek. Fish composites were analyzed for PCBs (polychlorinated bi-phenyls), pesticides and other toxins. The analytical data show detectable levels of PCBs, DDE, DDD, DDT, mirex, chlordane, trans-nonachlor, dieldrin, 3 dioxin congeners and 8 furan congeners. The highest PCB level (1407 ppb wet weight) was in y-o-y fish from Scajaquada Creek. These fish form the only severe threat to fish-eating consumers discovered in this study. PCB levels in y-o-y fish are of concern because they exceed the International Joint Commission whole-fish objective designed to protect fish-eating birds and wildlife.

SCAJAQUADA CREEK 0101-0023

Location Information

Updated: 06/27/96

Basin:	Lake Erie-Niagara River (01)	**Resolution Potential:**	Medium
Sub-Basin:	Niagara River Main Stem (01)		
Seg Type:	River	**Stream Class:**	B
Reg/County:	9 / Erie (15)	**7Q10 Flow:**	< 20 cfs
USGS Quad:	LANCASTER (J-06-1)		
Seg Size:	8.0 Miles		
Description:	From confluence with Niagara River to source		

Problem Information

(* indicates the PRIMARY Use Impairment/Pollutant/Source)

Use Impairment(s)	Severity	Documentation
Bathing *	Stressed	Some
Fishing	Stressed	Some
Fish Propagation	Stressed	Some
Fish Survival	Stressed	Some
Aesthetics	Stressed	Some

Type of Pollutant(s)

Aesthetics *	Unknown Toxicity	Priority Organics
Nutrients	Silt (Sediment)	Oxygen Demand
Salts	Thermal Changes	Water Level/Flow
Pathogens		

Source(s) of Pollutant(s)

CSO's *	Contaminated Sed.	Construction
Storm Sewers	Land Disposal	Chemical Leak/Spills
Hydromodification	Streambank Erosion	

Resolvability

Technical/Economic/Social Resources Do Not Allow Resolution

Further Details

USE IMPAIRMENT: Sewer overflows cause aesthetic problems in the creek and discourages fishermen and bathers. Sediment contamination noted in NRTC report. Suspect sediments contribute to toxic loading to Niagara River.

Cause: Inactive hazardous waste sites and CSO's.

Other concerns are: Turbidity problems; wildlife mortalities possibly associated with contaminated sediment; concerns about high nutrient concentrations and sludge banks along the creek. Hydromodification (stream bank stabilization/modification) is also a concern.

New York State SPDES Discharge Permits—Scajaquada Creek Watershed

Permittee	Address	Town	Type	Waterway	Permit Number	Facility Description
Buffalo Sewer Authority	Bird Ave.	Buffalo	CSO/Leaping Weir	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	Potomac Ave.	Buffalo	CSO/Manhole	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	W. Delavan Ave.	Buffalo	CSO/Weir and Orifice	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	W. Delavan Ave.	Buffalo	CSO/Weir and Orifice	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	Brace St.	Buffalo	CSO/Leaping Weir	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	Auburn St.	Buffalo	CSO/Leaping Weir	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	Breckenridge St.	Buffalo	CSO/Leaping Weir	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	Albany St.	Buffalo	CSO/Weir and Orifice	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	Scajaquada Drain	Buffalo	CSO/Weir and Gate	Scajaquada Creek	NY0028410	
Buffalo Sewer Authority	Nottingham Tr.	Buffalo	CSO/Weir	Scajaquada Creek	NY0028410	
Buffalo Sewer Authority	Tonawanda	Buffalo	CSO/Weir	Scajaquada Creek	NY0028410	
Buffalo Sewer Authority	West Ave.	Buffalo	CSO/Weir	Scajaquada Creek	NY0028410	
Buffalo Sewer Authority	Dewitt St.	Buffalo	CSO/Weir	Scajaquada Creek	NY0028410	
Buffalo Sewer Authority	Elmwood Ave.	Buffalo	CSO/Weir	Scajaquada Creek	NY0028410	
Buffalo Sewer Authority	Scajaquada Tunnel	Buffalo	CSO/Weir	Black Rock Canal	NY0028410	
Buffalo Sewer Authority	West Ferry St.	Buffalo	CSO/Weir	Black Rock Canal	NY0028410	
Town of Cheektowaga	George Urban Blvd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow
Town of Cheektowaga	Harlem Rd. at George Urban	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow
Town of Cheektowaga	Roycroft Blvd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow
Town of Cheektowaga	Kaufman Road at David Ave.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Overflow weir to storm
Town of Cheektowaga	Burke Drive At Century Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Overflow weir to storm
Town of Cheektowaga	Kensington Ave. at Century Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Overflow weir to storm
Town of Cheektowaga	Kensington Ave. at Century Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Overflow weir to storm
Town of Cheektowaga	S. Huxley Dr. near Seton Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	S. Huxley Dr. near Seton Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	Oehman Blvd. At Seton Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	Beach Rd. at Maryvale Dr.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control Gate to Storm
Town of Cheektowaga	Cedar Grove Cr. Near Brookhaven Dr.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	Allendale Rd. at Southgate Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control gate to Storm
Town of Cheektowaga	Allendale Rd. at Southgate Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control gate to Storm
Town of Cheektowaga	Fairvale Dr. at Beach Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control gate to Storm
Town of Cheektowaga	Expressway at Beach Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control gate to Storm
Town of Cheektowaga	Expressway at Beach Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control gate to Storm
Town of Cheektowaga	Rosary Rd. at Seton Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control gate to Storm
Town of Cheektowaga	Winston Ave. near Vegola Ave.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	Eggert Rd. near Cedar Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control Gate to Storm
Town of Cheektowaga	JFK Lane at North Creek Dr.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	Patric Lane at Meadowlawn Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control Gate to Storm
Town of Cheektowaga	Patric Lane at Meadowlawn Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control Gate to Storm
Town of Cheektowaga	Crandon Blvd. Near Harbour Ln.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	Homeworth Pkwy. At Meadowlawn Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	Homeworth Pkwy. At Meadowlawn Rd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control Gate to Storm
Town of Cheektowaga	Diane Dr. at Homeworth Pkwy.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Gravity/control Gate to Storm
Town of Cheektowaga	Lou Ann Dr. at George Urban Blvd.	Cheektowaga	SSO	Scajaquada Creek	NY-0032379	Pumped overflow to Storm
Town of Cheektowaga	171 Central Blvd.	Cheektowaga	SSO	Scajaquada Creek		
Town of Cheektowaga	Rosary Blvd. At Maryvale Dr.	Cheektowaga	SSO	Scajaquada Creek		
Village of Depew	French Rd. at Kreiger St.	Depew	SSO	Scajaquada Creek	NY-0203980	gravity overflow
Village of Depew	George Urban Blvd. At Colgate Dr.	Depew	SSO	Scajaquada Creek	NY-0203980	gravity overflow
Village of Depew	Sherwood Ct. at George Urban Blvd.	Depew	SSO	Scajaquada Creek	NY-0203980	gravity overflow
Village of Depew	Susan Dr. at Comell Dr.	Depew	SSO	Scajaquada Creek	NY-0203980	pump to storm sewer
Village of Depew	Lee St. at Transit Rd.	Depew	SSO	Scajaquada Creek	NY-0203980	gravity overflow
Village of Depew	Warner Rd. at Falcon Dr.	Depew	SSO	Scajaquada Creek	NY-0203980	gravity overflow
American Axle	1001 E. Delavan Ave	Buffalo	Industrial	Buffalo Sewer		
Fedco Automotive	57 Tonawanda St.	Buffalo	Industrial	Buffalo Sewer		
Fibron Prods. Inc	170 Florida St.	Buffalo	Industrial	Buffalo Sewer		
Westwood-Squibb	100 Forest Ave.	Buffalo	Industrial	Buffalo Sewer		
Quebecor Printing	2475 George Urban Blvd.	Depew	Industrial	Buffalo Sewer		

Source: Citizens Environmental Research Institute, December 1999

SCWAC Projects

While the focus of the Scajaquada Creek Watershed Advisory Council's effort was to develop a Watershed Management Plan, a number of activities and events were organized to help build public support and to encourage public participation. SCWAC members organized creek cleanups in Depew and Lancaster in 2001 and 2002, and participate annually in the Keep Western New York Beautiful creek cleanup at Delaware Park in April in celebration of Earth Day. Members have also been instrumental in the installation of a debris-collecting fence between the creek and Hoyt Lake in Delaware Park and discontinuing fertilizer use on streambanks in Cheektowaga.

SCWAC members and community groups participate in the annual Earth Day cleanup in the Delaware Park area.

Public Participation Efforts

Through the Great Lakes Aquatic Habitat Network and Fund, the Scajaquada Creek Watershed Advisory Council received funding in 2001 to develop and distribute brochures to inform watershed residents on proper streambank management and lawn care practices to protect riparian aquatic habitat. Brochures and coordinating posters are also being distributed to garden centers throughout Erie County.

Choosing a logo for the SCWAC provided an opportunity to bring the concept of watershed planning and protection to high school students in the watershed through a logo design contest. Adam Sabadasz, a student from McKinley High School, designed the winning logo, which appears on SCWAC letterhead and publications.

Streambank Restoration Efforts

The Erie County Soil and Water Conservation District received a grant from the Urban Resources Partnership (URP) of Buffalo (now the Partners for Urban Resources and Environment—Erie/Niagara) through USDA Natural Resources Conservation to improve riparian habitat and reduce soil erosion by removing tree snags and debris jams that had the potential to cause streambank erosion along Scajaquada Creek. Due to scheduling problems associated with the discontinuation of the URP initiative, only limited work was completed. The streambank work, in the Town of Lancaster and Village of Depew, was completed in September 2001.

Through a grant from the USDA-NRCS, a tree care crew removed trees in Depew that were threatening property (a home across the stream) and could potentially contribute to soil erosion if the roots were to break free from the streambank.

Buffalo State College Department of Geography and Planning is conducting sediment characterization and water quality monitoring and modeling in Scajaquada Creek through a project funded by the Great Lakes Research Consortium. Continuous monitoring and "grab" sampling was begun in summer 2002. This study will identify sediment sources for further streambank restoration projects. More information can be found on page 22.

Public Opinion Surveys

As a component of the URP project (above), watershed stakeholders, including residents, businesses, community groups, schools, environmental organizations, technical advisors, and municipal and elected officials were surveyed to determine their priority watershed concerns. The management goals and objectives in this plan have been developed to address the stakeholders' priority concerns.

The approaches used to develop watershed concerns were as follows:

A direct-mail survey of 1200 stakeholders in January 2001 identified their environmental concerns and provided them with an opportunity to express their opinions of the creek and its condition.

Then, at a general meeting of the Scajaquada Creek Watershed Advisory Council, stakeholders identified watershed concerns and initiated a prioritization process.

A second survey in summer 2001 gave stakeholders the opportunity to rank the concerns. The surveys and results, beginning on page 23, have been used to assist the SCWAC Technical Committee in developing Watershed Protection and Restoration Goals.

The SCWAC will continue to serve as technical advisors and assist municipalities, organizations and other stakeholders in seeking funding sources in implementing the Watershed Management Plan, as well as provide ongoing evaluation of the Plan and watershed protection efforts.

Identification of Sediment Source Areas for a Highly Polluted Urban Creek

Principal Investigator: Dr. Shreeram Inamdar

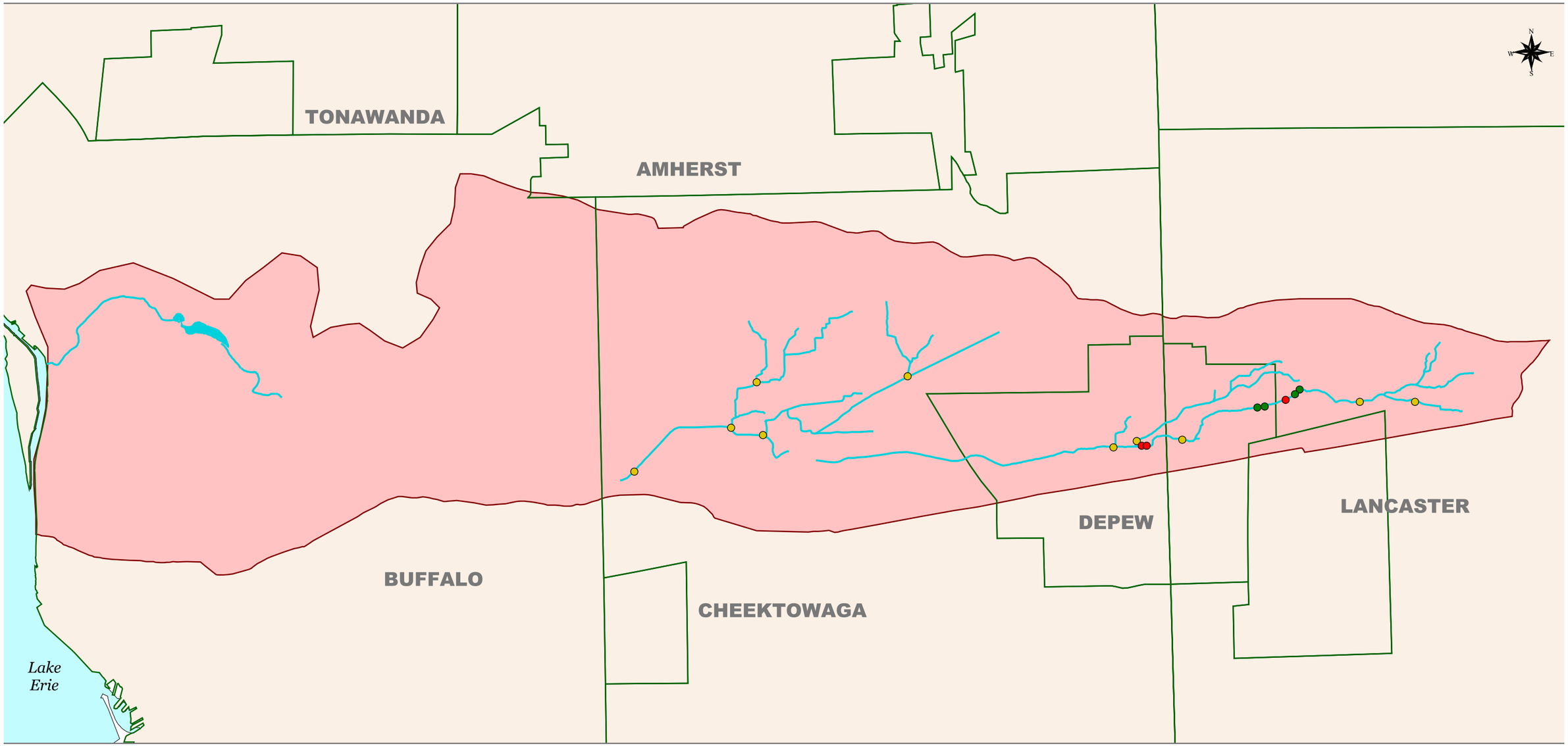
Collaborators:

- Mr. John Whitney, District Conservationist, USDA-NRCS, Erie County, NY.
- Ms. Ellen Hahn Ilardo, Water Quality Technician, Erie County SWCD, NY.

Abstract of Project

Scajaquada Creek has been identified as one the most polluted tributaries contributing to the Niagara River AOC. High concentrations of heavy metals, PCBs, and Dioxins have been reported in the Creek sediments and are a cause of concern. Dredging of these existing sediment beds is one of the proposed solutions. Suburban development activities in headwater reaches though appear to be contributing a majority of the current sediment load to the creek. These new sediment contributions are compounding the problem of dredging existing contaminated sediments. Natural resource agencies responsible for the health of the watershed are very keen to identify these sources so that appropriate management measures could be implemented to control these new sources of pollution. We propose to identify these new sediment source areas and quantify their contributions using a combination of monitoring and modeling approaches. Monitoring will be performed using continuously recording hydrolabs and grab sampling for suspended sediment. The GIS based SWAT model will be implemented for the watershed to develop sediment budgets for subbasins and creek reaches. The model will then be calibrated and verified using monitored data. The GIS based model can then be used as a tool by the resource agencies to identify critical source areas of sediment and target appropriate management practices (riparian buffers, filter strips, etc.) for these locations. Knowledge of sediment contributors will also provide some scientific basis for citizens groups in the watershed to argue their case (for reducing sediment pollution to the creek) with suburban town councils and zoning authorities.

Note: Study results will be released as they become available.



1 0 1 2 3 Miles

Scajaquada Creek Watershed Advisory Council
Erie County Soil and Water Conservation District
USDA Natural Resources Conservation Service

- Tree and Debris Removal, 3 sites, 2001
  Erie County Soil and Water Conservation District
- Sediment and Water Quality Monitoring, 10 sites, 2002
  Great Lakes Center, Buffalo State College
- Streambank Restoration for Erosion Control, 4 sites, 2003
  Erie County Soil and Water Conservation District
- Scajaquada Creek and Tributaries
- Scajaquada Creek Watershed
- Municipal Boundaries

Scajaquada Creek Watershed

Erie County, New York

SCWAC Project Sites

Plate 8

Resident and Stakeholder Survey Results

February 20, 2001
109 Survey responses received

Residence Location:

Buffalo	15%
Cheektowaga	19%
Depew	17%
Lancaster	8%
Other	2%
Blank	39%

Length of Residence:

1-5 years	24%
6-10 years	12%
11-20 years	13%
20+ years	46%
Blank	5%

Do You Participate in Cleanups or Are You Aware of Cleanups:

Yes	22%
No	62%
Blank	16%

Degree of Negative Impact:
Average ranking (1=minimal impact, 5=significant impact)

Litter, Debris	4.31
Toxic Discharges, Toxic Waste	3.98
Wastewater, Stormwater Discharges	3.97
Pesticides, Fertilizers / Development (tie)	3.49
Streambank Erosion	3.44

Priority Watershed Concerns

As Identified at Stakeholder Meeting
February 26, 2001

Water Quality

Combined Sewer Overflows (CSOs)	8
PCBs	7
Sanitary Sewer Overflows (SSOs)	4
Litter and Debris	3
Sedimentation	2
Nonpoint Sources Discharges	2
Mystery Drains	2
Seepage from Industrial Dumping	2
Point Source Discharges	1
Pathogens	1
Toxic Sediment	1
Atmospheric Deposition	1
Dioxins	1
Lack of Vegetation	1
Lack of Wetlands Filtration	1

Aesthetics / Recreation / Culture

Litter / Shopping Carts / Graffiti	3
Regular Trash Rack Maintenance	3
Public Education	3
Regular Maintenance of Whole Creek	2
Relations between City and Suburbs	2
School Programs - Stewardship	2
Development	1
Lack of Trees	1
Wetlands	1
Urban Restoration	1
Access to Creek from Streets	1
Loss of Identity / Presence (Buried Section)	1
Historical Uses of Delaware Park	1

Habitat

Wetland / Floodplain Restoration	6
Restore Geo-fluvial Functions	5
Sediment / Sludge / Contaminants	4
Urban Wildlife Habitat Education	3
Economic Benefits of Habitat Restoration	2
Habitat as Buffer Zone	1
Mimic Natural Stream Characteristics	1
Increase Inflow to Creek	1
Eat Scajaquada Fish Safely	1

Water Quantity

Impervious Surfaces	5
Lack of Water Quality Education	3
Loss of Recharge Areas - Low Flows	1

Buffalo - 57 respondents

Rank	*Concern*	*Average*	*#1 Votes*
1	Creek and Hoyt Lake in Delaware Park	2.16	20
2	PCBs and toxic stream sediments	2.55	10
3	Combined sewer / Sanitary sewer overflows	2.69	14
4	Litter and debris dumping	2.77	5
5	Public awareness and education	3.22	3
6	Development in suburbs	3.38	2
7	Wetland / floodplain restoration and protection	3.61	
8	Extent of impervious (paved) surfaces	3.70	1
9	Streamside wildlife habitat enhancement	3.87	2
10	Recreational opportunities	4.00	
11	Non-native invasive plants	4.00	
12	Impact of flood control projects on streams	4.25	

Cheektowaga - 14 respondents

Rank	*Concern*	*Average*	*#1 Votes*
1	Public awareness and education	2.00	3
2	PCBs and toxic stream sediments	2.18	5
3	Combined sewer / Sanitary sewer overflows	2.42	1
4	Litter and debris dumping	2.89	
5	Development in suburbs	3.00	2
6	Impact of flood control projects on streams	3.00	1
7	Streamside wildlife habitat enhancement	3.33	2
8	Wetland / floodplain restoration and protection	3.50	
9	Recreational opportunities	4.00	
10	Creek and Hoyt Lake in Delaware Park	4.67	
11	Extent of impervious (paved) surfaces	5.00	
12	Non-native invasive plants	5.00	

Depew - 13 respondents

Rank	*Concern*	*Average*	*#1 Votes*
1	Combined sewer / Sanitary sewer overflows	2.00	4
2	Development in suburbs	2.14	3
3	Wetland / floodplain restoration	2.80	2
4	PCBs and toxic stream sediments	3.00	1
5	Extent of impervious (paved) surfaces	3.00	
6	Litter and debris dumping	3.09	1
7	Impact of flood control projects on streams	3.40	1
8	Public awareness and education	3.75	1
9	Streamside wildlife habitat enhancement	4.00	
10	Non-native invasive plants	4.00	
11	Creek and Hoyt Lake in Delaware Park	5.00	
12	Recreational opportunities	no votes	

Lancaster - 9 respondents

Rank	*Concern*	*Average*	*#1 Votes*
1	Development in suburbs	1.33	2
2	Combined sewer / Sanitary sewer overflows	1.75	1
3	Recreational opportunities	2.00	
4	Streamside wildlife habitat enhancement	2.20	2
5	PCBs and toxic stream sediments	2.40	1
6	Non-native invasive plants	3.00	
7	Wetland / floodplain restoration and protection	3.50	1
8	Impact of flood control projects on streams	3.50	
9	Public awareness and education	3.80	1
10	Litter and debris dumping	3.80	1
11	Extent of impervious (paved) surfaces	4.50	
12	Creek and Hoyt Lake in Delaware Park	no votes	

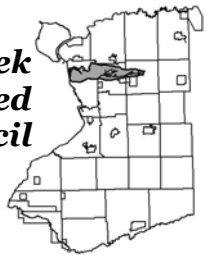
All Municipalities

Rank	*Concern*	*Average*	*#1 Votes*
1	Creek and Hoyt Lake in Delaware Park	2.38	20
2	Combined sewer / Sanitary sewer overflows	2.49	20
3	PCBs and toxic stream sediments	2.54	17
4	Development in suburbs	2.78	9
5	Litter and debris dumping	2.90	7
6	Public awareness and education	3.19	8
7	Wetland / floodplain restoration and protection	3.46	3
8	Streamside wildlife habitat enhencement	3.58	6
9	Impact of flood control projects on streams	3.68	2
10	Extent of impervious (paved) surfaces	3.74	1
11	Recreational opportunities	3.90	
12	Non-native invasive plants	4.11	

5/2/2002

Erie County Soil and Water Conservation District
50 Commerce Way
East Aurora New York 14052
Phone: (716) 652-8480 Fax: (716) 652-8506

Scajaquada Creek Watershed Advisory Council



Scajaquada Creek Watershed Resident and Stakeholder Survey

Scajaquada Creek is a unique urban stream – it has been buried (in three different places – one section goes underground for over four miles!), it has been straightened and managed for flood control, and yet it remains a resource for wildlife habitat and recreational uses.

The Erie County Soil and Water Conservation District has received funding from the Erie County Legislature to establish a Watershed Advisory Council for the Scajaquada Creek Watershed. An inspection of the stream corridor was completed this summer and we are now beginning to identify which concerns are the most important to the residents and stakeholders in the watershed. The Advisory Council would like your input in determining important environmental issues and concerns throughout the watershed.

We value your ideas and opinions! We would appreciate your response to this survey. Your responses will be given consideration as we develop recommendations for protecting and/or restoring the stream. The recommendations will be presented in a draft watershed management plan. If you want to be sure your opinion is heard, please submit this survey!

Please take a few minutes to answer the following questions:

♦ How long have you lived, worked or represented residents within the Scajaquada Creek Watershed?

_____ 1 – 5 years _____ 6 – 10 years _____ 11 – 20 years _____ 20+ years

♦ What positive and/or negative changes to Scajaquada Creek have you witnessed in that time?

_____

_____

_____

♦ What role does Scajaquada Creek play in your everyday life, business or activities? (ex. recreational, cultural, economic, etc.)

_____

_____

_____

♦ In your opinion or experience, to what extent do the following negatively impact Scajaquada Creek?

	1 = minimal impact				5 = significant impact					
Development	1	2	3	4	5	Toxic Discharges / Toxic Waste	1	2	3	4	5
Streambank Erosion	1	2	3	4	5	Wastewater or Stormwater Discharges	1	2	3	4	5
Pesticides / Fertilizers	1	2	3	4	5	Other (specify) _____	1	2	3	4	5
Litter / Debris	1	2	3	4	5	Other (specify) _____	1	2	3	4	5

♦ Are you active in community groups such as block clubs, school organizations, church organizations or business associations that have an interest in issues pertaining to Scajaquada Creek? (please describe)

_____

(Optional) Name of group(s) or organization(s) _____ contact: _____

♦ Do you participate in or are you aware of local neighborhood environmental cleanup efforts? _____ yes _____ no

(date, location, description) _____

✱ *If you would like to receive information about Scajaquada Creek Watershed cleanup activities, planning meetings and workshops, please provide your name and address below:*

Name _____

Address _____

City / State / Zip _____

You may use the reverse side for any additional comments. Thank you for your assistance!
Please return to Erie County Soil and Water Conservation District.

SCAJAQUADA CREEK WATERSHED ADVISORY COUNCIL

c/o Erie County Soil and Water Conservation District
50 Commerce Way
East Aurora New York 14052
Phone (716) 652-8480 Fax (716) 652-8506
ellen-hahn@ny.nacdnet.org

Dear Resident of Scajaquada Creek Watershed,

The Scajaquada Creek Watershed Advisory Council would like your help. We are drafting a plan for protecting and restoring natural resources in your community and want to be sure we are addressing *your* concerns as we develop recommendations to bring to your municipal officials.

Environmental, economic, and quality of life concerns differ depending on where you live in the watershed. When we approach local conservation or planning boards with our recommendations, we want to accurately represent the interests of each community.

Landowners we surveyed a few months ago identified the concerns listed below. Please take a moment to provide us with your opinion by choosing the **five** concerns below that are most important to you. We appreciate and value your response!

Please rank your top five concerns from 1 to 5: ***1 = Most Important*** ***5 = Least Important***

_____ Development in suburbs
_____ Extent of impervious (paved) surfaces
_____ Recreational opportunities
_____ Combined sewer / Sanitary sewer overflows
_____ Litter and debris dumping
_____ PCBs and toxic stream sediments
_____ Streamside wildlife habitat enhancement
_____ Impact of flood control projects on natural streams
_____ Wetland / floodplain restoration and protection
_____ Non-native invasive plants
_____ Public awareness and education
_____ Creek and Hoyt Lake in Delaware Park

See other side for an explanation of terms used in the concerns listed above.

Please indicate your town / village / city: _____ Buffalo _____ Cheektowaga _____ Depew _____ Lancaster

If you have any concerns not listed above, please use the space below to tell us about them:

_____

_____

❑ I would like to receive information about Scajaquada Creek Watershed cleanup activities, planning meetings and workshops.

(*Optional*) Name _____ Email _____

Address _____

City _____ State _____ Zip _____ Phone _____

Please mail or fax to: Scajaquada Creek Watershed Advisory Council
c/o Erie County Soil and Water Conservation District, 50 Commerce Way, East Aurora NY 14052-2185
Phone: (716) 652-8480 Fax: (716) 652-8506

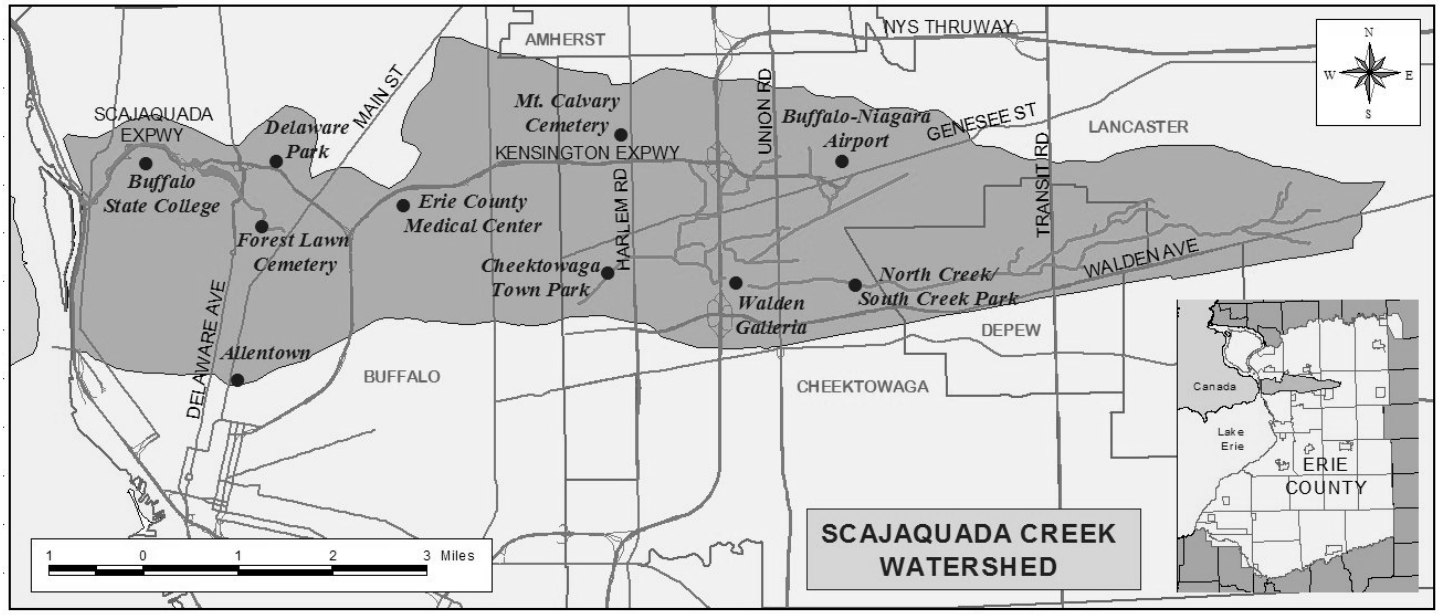
Explanation of Terms:

Watershed – A watershed is a geographic boundary, like a shallow bowl, that determines which way surface water will flow. All precipitation that falls on the land within that boundary drains to a particular body of water or common point. The Scajaquada Creek Watershed drains into the Niagara River at Black Rock.

Impervious surfaces – Parking lots, driveways, streets and rooftops all prevent rain and snow from falling directly on the ground and infiltrating (or soaking into) the soil. Rainfall on these surfaces becomes "runoff," and it drains directly into streams, potentially harming aquatic life with road salt, oil, chemicals, fertilizers and pesticides. Too much water draining into streams at once can cause local flooding. Water that is allowed to soak into the ground enters streams more slowly and pollutants are filtered through the soil. Rain gutters and sump pumps must drain into lawns instead of the sewer. This is the law!

Combined Sewer Overflow – Older cities such as Buffalo often have combined sanitary and storm sewers that carry wastewater and rain water to the sewage treatment plant. During heavy rains, the plant cannot process the additional rain water, so some of the sewer flow (including rain water and raw sewage) must be discharged directly into streams.

Sanitary Sewer Overflow – Much the same as CSO above, sanitary sewers carry only wastewater (sewage), and during heavy rains often must be discharged directly into streams.



Scajaquada Creek Watershed

Scajaquada Creek is a unique urban stream – it has been buried in three different places – one section goes underground for almost four miles! It has been straightened and managed for flood control, and yet it remains a resource for wildlife and recreational uses.

Hundreds of people drive over or past Scajaquada Creek every day – and many don't even know it's there! Some people enjoy the stream right in their own backyard, while others use the playgrounds and parks that border the stream.

The stream begins in suburban Lancaster, flows through parks and behind homes in Depew and Cheektowaga, under the Walden Galleria, and through the City of Buffalo, where it enters a tunnel that extends from Pine Ridge Road all the way to Forest Lawn Cemetery. Recent efforts to add recreational opportunities to the stream include a bicycle path from Delaware Park all the way to the Black Rock Canal, where Scajaquada Creek ends its journey.

On the map above, the heavy black line represents the boundary of the Scajaquada Creek Watershed. Almost every human activity, including transportation, lawn care, industrial operations, flood prevention, waste management, and even recreation, affects the quantity and quality of water in the watershed. Water quality can be impacted by activities anywhere in the watershed – in the main branch of the stream, in its tributaries, or on the land in between.

Everyone lives in a watershed – with its own unique set of water quality issues. And everyone can enjoy the streams in their watershed – they provide outdoor recreation opportunities and natural areas to observe wildlife and seasonal changes. Healthy ecosystems provide clean air and water, natural spaces for parks and neighborhood gardens and make communities a better place to live.

Watershed Programs and Projects

Scajaquada Corridor Study

The City of Buffalo is working with the NYS Department of Transportation, Erie County, and an Advisory Group consisting of representatives from various interested agencies to conduct the Scajaquada Corridor Study.

The Scajaquada Expressway (NYS Route 198) travels from I-190 (New York State Thruway – Niagara Section) on the west to the Kensington Expressway (NYS Route 33) on the east and it is 3.6 miles long. The segment of the Scajaquada included in this study is 2.2 miles long with study limits bounded by Grant Street to the west and Parkside Avenue to the east. It is partly within the boundaries of the Olmsted designed historic Delaware Park. Traffic volumes through the study area range from 43,000 to 54,000 vehicles a day.

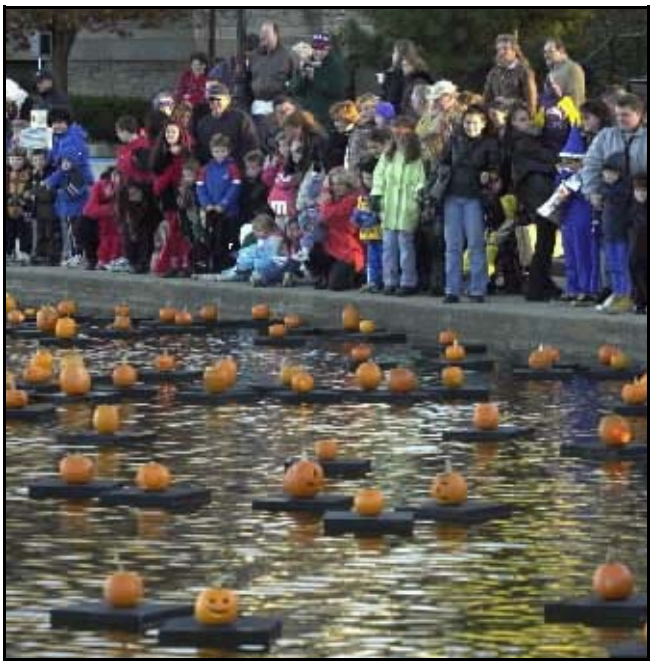
This study was initiated because the expressway is not in harmony with adjacent land uses, including educational and cultural institutions. It disturbs the aesthetics of historic Olmsted-designed Delaware Park. It also has periods of congestion and accident problems. The study began in October 2001 and it is projected to be completed in March 2003.

Friends of the Buffalo Niagara Rivers

Friends of the Buffalo Niagara Rivers is a non-profit regional river advocacy organization established to "promote, preserve and protect the natural and historical environments of the Buffalo Niagara Rivers and their environs for the benefit of the local community." The FBNR goals are to: Restore the ecological health of Buffalo-Niagara River systems; express and celebrate the cultural and historic fabric of the area; improve public access along the Rivers by surrounding communities and citizens of the region; encourage community awareness, "ownership" and stewardship of the Rivers; support sustainable development of the region's economy; and develop a regional River advocacy organization capable of achieving the above goals. FBNR has welcomed the Scajaquada Creek Watershed Advisory Council into the organization to continue successful natural resources protection efforts.

Buffalo Olmsted Parks Conservancy

The Buffalo Olmsted Parks Conservancy is a not-for-profit, membership-based, community organization that grew out of the Friends of Olmsted Parks, which was founded in 1978. The Conservancy's mission is to promote, preserve, restore, enhance, and ensure the maintenance of Olmsted-designed parks and parkways in the Greater Buffalo area to guarantee Olmsted park experiences for current and future generations. In January 1999, the Buffalo Olmsted Parks Conservancy was one of only eight parks organizations nation-wide to be awarded a Lila Wallace-Reader's Digest Fund - Urban Park Initiative grant. The Conservancy received $700,000, which must be matched one-to-one over four years. One of the major initiatives of the Lila Wallace grant is to reforest Delaware, Martin Luther King, Jr. and Front Parks, the first three parks in Buffalo built by Olmsted, and listed on the National Register of Historic Places. Park landscape improvements increase property values, create a more inviting atmosphere for recreation and tourism, renew a sense of pride and ownership in efforts to preserve green space, and provide environmental benefits such as moderating temperatures, purifying the air and protect our water resources by minimizing soil erosion and runoff. Through this incredible environmental, cultural and historic resource, we can build community, improve the city's economy, and showcase the beauty of Buffalo to others.



The annual Halloween Pumpkin Float on Hoyt Lake increases public awareness of recreational opportunities in the Scajaquada Creek watershed.

Photo by Harry Scull Jr., Buffalo News

Scajaquada Pathway

The Scajaquada Pathway is a multi-use trail located along Scajaquada Creek connecting Delaware Park - the largest Olmsted designed park in Buffalo - and the Buffalo and Erie County Riverwalk multi-use trail. Phase 3 of the Scajaquada Pathway Project will extend from the end of the west of Niagara Street to the Riverwalk. Completion of the project will result in a 1.75-mile multi-use trail intersecting the 14-mile Riverwalk. Phase 3 includes a bridge over Scajaquada Creek, a Black Rock Channel Scenic Overlook, and access improvements at the intersection of the Riverwalk and U.S. Army Corps of Engineers property. When complete, the Scajaquada Pathway is expected to be a heavily used urban greenway trail.

Local Waterfront Revitalization Program

Buffalo Mayor Anthony Masiello's Office of Strategic Planning is supervising the undertaking of a Local Waterfront Revitalization Program (LWRP) for the City of Buffalo's shorelines. Recognizing the importance of this unparalleled resource to the health of our City, this planning effort will serve as a road map to help guide the future implementation of the many important and worthwhile citizen efforts on behalf of our waterfront. The LWRP has been funded by New York State, the Margaret L. Wendt

Foundation, Erie County and the City of Buffalo. An initial inventory of all potential waterfront resources is almost complete and startup of the public participation and policy development phase is imminent.

The Local Waterfront Revitalization Plan will provide an opportunity to evaluate waterfront resources, decide on future goals and develop a strategy for the best use of coastal resources. The LWRP is an extension of the State's Coastal Zone Management Program governed by the Division of Coastal Resources through NYS Department of State.

Buffalo Waterfront Corridor Initiative

The Buffalo Waterfront Corridor Initiative is an action program to organize for change on our waterfront starting right now. The BWCI has been created to: Develop the economies of neighborhoods, the community and region; extend direct access to our waterfront from Riverside to South Buffalo; revitalize our waterfront neighborhoods and connect them to the water; protect and repair the health of our water, land and wildlife along the waterfront; and create a magnificent international gateway at and around the Peace Bridge. The Buffalo Waterfront Corridor Initiative is a partnership of the City of Buffalo, Friends of the Buffalo Niagara Rivers, the Urban Design Project at the University of Buffalo School of Architecture and Planning, Wendel-Duchscherer Architects and Engineers, and the Waterfront Regeneration Trust.

Buffalo Waterfront Greenway System

The Buffalo Waterfront Greenway System is a proposed linear park made up of trails, on-road bike lanes, parks and open space that covers the entire city waterfront and connects that waterfront with Buffalo's magnificent park system. It is a year-round place for free family fun. The Greenway is both a pathway and the embodiment of a principle. The principle is that the waterfront belongs to the people and that generous, green, easily accessible space at the water's edge is an important part of waterfront development. The pathway will connect and run through activity centers throughout the waterfront. It will provide pedestrians, bicyclists, joggers, skaters, strollers, skiers and others with a sense of ownership and familiarity as they approach and traverse the waterfront. The Scajaquada Pathway, beginning in Delaware Park, is a component of the Greenway system. Other areas in the Scajaquada Creek watershed proposed for pathways include abandoned rail lines and roads connecting the East Side to the Scajaquada Pathway.

Niagara River Globally Significant Important Bird Area

The City of Buffalo Common Council adopted a resolution in 1998 designating the Niagara River Corridor, which includes lower Scajaquada Creek, a globally significant important bird area. This designation means that the ecology of the Niagara River Corridor must be carefully integrated into the City's plans, laws, projects and processes. The State of New York and local organizations agreed to a statement of purpose "recognizing the vital importance of the Niagara River Corridor to the continued health and welfare on a local, regional, hemispheric and global scale, to a diverse array of bird species and other living resources, we agree to work cooperatively toward the stewardship of the natural communities and resources upon which they depend."

A stream inspection was conducted in June and July of 2000 from the headwaters in Lancaster to the mouth at the Black Rock Canal, excluding the tunneled sections. Following is a summary of the inspection, conducted by Erie County Soil and Water Conservation District Technicians.

Inspection parameters included streambank erosion, tree snags (overhanging trees that may cause bank erosion if uprooted), debris jams, vegetation concerns, culvert and rock wall damage, and general aesthetics including litter and dumping. Limited observations were made with regard to in-stream biology, including benthic (bottom-dwelling) macro-invertebrates and presence of fish species. Sites were ranked high, medium and low within these categories for the purposes of applying for funding to address areas of concern. Numbers on photos and maps correspond to numbered descriptions in the narrative.

Section Inspected: Headwaters to Traceway Drive, Lancaster

Headwaters of the Scajaquada Creek Watershed lie to the east of 81 Stony Road [Map 1 #1]. A culvert under the driveway on this property and 24" pipe under Stony Road serve as the origin of the creek. The drainpipe carries the flow west to the Quail Run development. Flooding occasionally occurs due to a possibly undersized pipe.

[Map 1 #2] Box culvert at Quail Run development, Lancaster

The drainage from Stony Road crosses the Quail Run development [Map 1 #2] through a 36" pipe to a wet retention basin. A series of retention basins throughout the three new housing developments in this reach intercept the creek and transport the flow through either 36" pipe into the basins or box culverts at road crossings.

The modified channel bed and banks contain grasses and cattails; the bottom is rocky upstream and downstream of each culvert and the banks are well vegetated downstream of the developments in the undisturbed areas. Where development borders the stream, slight slumping and bank erosion has occurred, possibly due to the lack of vegetative buffers on some of the new lots that are mowed to the edge of the stream.

Section Inspected: Traceway Drive, Lancaster to George Urban Blvd, Depew

[Map 1 #3] Streambanks in this reach of Scajaquada Creek are mostly well vegetated, however some sections lack riparian vegetative buffers and these areas exhibit some bank erosion. This includes slumping, undercutting banks, exposed roots and trees that have fallen into the channel, all contributing to the sediment load in the stream. The channel contains pools, riffles and rocks, which typically provide good habitat for fish and benthic organisms, but due to the turbidity of the water it was impossible to determine if fish species were present.

[Map 1 #4] There are many sites along this section of the creek where vegetative debris (including tree limbs), concrete blocks and other refuse have accumulated, damming the channel. Some local flooding has occurred behind some of these dams. A section of stream north of Falcon Drive [Map 1 #5] has eroded on both banks for approximately 400 feet. The banks are about 8 feet high and nearly vertical.

[Map 1 #5] Bank erosion north of Falcon Drive, Depew

Section Inspected: George Urban Blvd, Depew to Dick Road, Cheektowaga

[Map 2 #6] This section of Scajaquada Creek flows through older residential developments and many of the homes are within 50 feet of the stream banks. Historic aerial photographs show that the channel has been straightened to follow the streets and concrete block walls support what would otherwise be steep banks in many areas of this reach. The walls are from two to eight feet high. Some landowners have constructed retaining walls [Map 2 #7] with concrete bags or dumped rock, and there are a few garages within ten feet of the stream channel. Bank erosion is minimal above the walls.

Natural banks in this section are vegetated with mature trees and some understory growth, mostly woody plants. Some trees are leaning into the stream and/or have exposed roots. Some bank erosion is occurring, particularly behind Harvard Avenue [Map 2 #8], where some vertical banks exist. Gravel or silt bars have formed in the channel in several locations, indicating that stream velocity decreases in these areas, dropping at least a part of the sediment load. A high water mark from the last rainfall was visible on the vegetation at about 3 feet higher than the water elevation observed during inspection.

Bank erosion is evident at the Ledyard Avenue bridge [Map 2 #9] at a discharge pipe. The railroad bridge west of Ledyard Avenue has a center abutment that has been collecting debris and causing sediment deposition. The water is turbid in much of this section, prohibiting direct observation of the channel bottom. Some large metal and wood debris was found in the streambed, mostly near residential areas.

The section of the stream behind the Harlequin Distribution Center [Map 2 #10] and between North Creek and South Creek Roads contains many areas with rocky bottoms, riffles and pools that may be providing fish habitat. There is minimal bank erosion in this section.

[Map 2 #6] Exposed tree roots, George Urban Blvd, Depew

Section Inspected: Dick Road, Cheektowaga to Walden Galleria Mall

Scajaquada Creek enters a Town of Cheektowaga flood control project at the west side of Dick Road [Map 3 #11]. The creek is flanked by North Creek and South Creek Roads,

[Map 3 #11] Bank erosion at North Creek Road, Cheektowaga

and a town park lies between the roads and channel. The banks are at approximately a 1 to 1 (45°) slope and are well vegetated with crownvetch, thistle, grasses and sporadic shrubs. The streambed is approximately 15-20 feet below the top of the banks. Minor bank erosion has occurred on the north bank just downstream of a pedestrian bridge; for about 50 feet the banks are vertical and bare to a height of about three feet.

A center abutment on the Nagel Street bridge [Map 3 #12] has accumulated debris and the downstream left apron has eroded to expose the roots of a willow on the bank. Holes on the banks in this section are likely to have been caused by muskrats that were observed in the stream during the inspection.

The flood control project continues past the Union Road bridge [Map 3 #13] at which two culverts carry the stream flow and a large box culvert in the floodplain carries storm flow. A long section of tree limb, approximately 30 feet in length, lies along the north bank upstream from the bridge. Downstream of the bridge there is some sediment deposition and some algae in the pools, potentially indicating excessive nutrients in the stream. The banks are vegetated with crownvetch, birdsfoot trefoil, daisies, goldenrod and several mature willows. Schools of small fish were observed in the stream, which appears to be well oxygenated due to placed rock riffles.

The stream becomes tunneled with a concrete floodway under the Walden Galleria Mall [Map 3 #14] and emerges at Galleria Drive at the flood control project discussed below.

Section Inspected: Walden Galleria Mall to Pine Ridge Road, Buffalo

The combined U.S. Army Corps of Engineers/NYS Department of Environmental Conservation/Town of Cheektowaga flood control project [Map 3 #15] has been in place since 1981. Much of this section has been straightened and the banks have been graded for 100-year flood control. Several of the tributaries in this area were also inspected.

[Map 3 #15] Tributary 2 downstream of Beryl Drive, Cheektowaga

The banks of the main branch and tributaries are well vegetated with herbaceous perennials, including many native species as well as some non-native invasive plants such as purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*) and common reed (*Phragmites australis*). Some areas, mainly on the tributaries, are overgrown and have become habitat for rats and other pests. Dumping of yard waste and construction debris has also contributed to the problem. The Town of Cheektowaga Highway Department maintains many sections of the streambanks by mowing and removing woody vegetation that impedes stream flow during periods of high flow. Mowing operations are scheduled to allow crownvetch, a bank stabilization plant, to regenerate and spread. In sections that have minimal base flow algae has accumulated on the streambed.

[Map 4 #18] Tunnel entrance at Pine Ridge Road, Cheektowaga

Missing toe rock and drainage pipes discharging into the stream channel have contributed to minor bank erosion in some areas. Muskrats were observed in the stream channel, and may be an additional factor in bank erosion. Several landowners have mowed the banks to the stream edge. Some sediment deposition has occurred at several bridges.

West of the NYS Thruway interchange at Galleria Drive are 500-year flood control basins [Map 4 #16] built in conjunction with this project. The banks of Scajaquada Creek in this reach are well vegetated, with some woody vegetation where the banks are too steep to safely mow.

Downstream from McNaughton Avenue the banks are steep but well vegetated. A slight slump has occurred on the top of the north bank near Central Blvd [Map 4 #17]. The toe is still intact, but this area should be monitored for additional slope movement.

The channel widens at the tunnel entrance at Pine Ridge Road [Map 4 #18] where excessive algal mats accumulate on the concrete bottom in summer months. Four concrete piers prevent large debris from entering the tunnel, but smaller objects are able to pass. A debris grate is in place between the piers on the high flow section of the channel.

Section Inspected: Forest Lawn Cemetery to Hoyt Lake

Scajaquada Creek emerges from the tunnel on the west side of Main Street at Forest Lawn Cemetery [Map 5 #19]. A storm sewer pipe also emerges from within the tunnel but was not flowing at the time of the inspection. Water clarity at the tunnel outlet was good and no odor was detected

[Map 5 #20] Sediment bar (left) in Forest Lawn, Buffalo

during the inspection, at a period of low flow. The streambed is shaly throughout this section and the banks are steep in some areas but well vegetated.

Much of the course through the cemetery has been walled with stacked rock or concrete walls [Map 5 #20]. Some minor bank erosion is occurring in small sections, and some sediment deposition has created gravel or silt bars in several locations. Upstream from the bridge below Serenity Falls is a section of eroding bank.

Three discharge pipes near the crematorium [Map 5 #21] were discharging discolored water into the stream at the time of inspection. The streambed below these discharges has an algae accumulation. Further investigation may be necessary.

Several mallards and Canada geese were congregating in the stream and on the banks near a pond in the cemetery. Two schools of small fry were observed near the third bridge. Downstream from the third bridge (closest to Delaware Avenue) is a small slump [Map 5 #22].

As the creek continues on its course downstream the water becomes increasingly more turbid and sediment deposition also increases. When agitated, black bottom sediments plume up in the water, emitting a foul odor.

[Map 5 #23] Trash rack on Scajaquada Creek (left) and Hoyt Lake (right rear) in June 2000

[Map 5 #23] Trash rack (left) and Hoyt Lake (right) in September 2002 after installation of debris-collecting fence

There was an accumulation of debris, including garbage, algae, decaying plant matter and some tree limbs at the grate next to Hoyt Lake [Map 5 #23] at the time of inspection. A City of Buffalo Public Works crew was on site to clean the grate. At the trash rack the stream enters two short conduits next to the lake.

The shoreline of Hoyt Lake, an engineered retention basin now disconnected from the creek, has been lined with cobblestones that are mostly submerged, the water is fairly clear, but there are many algal mats in the lake. Dead carp were observed along the shore. The banks are steep in only a few small areas; some of these are lined with rock and a few areas are bare and vertical [Map 5 #24].

At the western end of Hoyt Lake a concrete dam separates the retention basin from Scajaquada Creek as it outlets from the by-pass conduit next to the lake [Map 5 #25]. Live and dead algae were observed in the creek and lake.

Section Inspected: Hoyt Lake to mouth

Under the Elmwood Avenue bridge and Scajaquada Expressway off-ramp some rock riprap is missing or disturbed [Map 5 #26]. The water in the entire reach is

turbid and there is sediment accumulation along most of the banks. When disturbed, the streambed sediment rises to the surface and is black and odorous. Several silt bars have formed where sediment deposition is occurring. A heron and several large carp were observed in the channel, and several dead fish were observed on the banks [Map 5 #27].

A creekside cleanup in celebration of Earth Day is conducted annually in April by community groups and the Buffalo Police Underwater Recovery Team between Elmwood Avenue and Grant Street, and is partially sponsored by Keep Western New York Beautiful. Large debris removed from

[Map 5 #28] Debris removed from the stream during the April 2001 cleanup demonstrated the need for fence repairs

the debris collection rack ("finger" dam) east of Grant Street near Assumption Church included shopping carts, tires, plastics, metal posts, steel drums and tree limbs [Map 5 #28]. Several truck loads of litter are also removed from along the banks each spring.

[Map 5 #28] New railing installed in Fall 2002 at finger dam along the Scajaquada Pathway

During the inspection in June 2000, two months after the spring cleanup event, 10 additional shopping carts from Wegmans and Tops supermarkets and other unidentified businesses were observed in the stream. Seven of them lay at the base of the finger dam where sheet pilings support the bank and a foot path descends to the edge. A wooden rail fence along the path has been severely damaged. At the time of inspection in June 2000 it was noted that there is a need for steel fencing in this area to discourage the dumping. Damage to the wooden fence continued, and in September

[Map 5 #29] Rill erosion on the streambank along the recreation path under Scajaquada Expressway

2002 a steel railing was installed with a Community Development Block Grant through Councilmember Joseph Golombek and the Buffalo Urban Renewal Agency.

The banks of Scajaquada Creek from Hoyt Lake to the mouth are well vegetated with native plants, and non-native invasive species including Japanese knotweed, purple loosestrife, locust, catalpa, white ash, sumac and viburnum. The exception is the section under the Scajaquada Expressway [Map 5 #29], where a bike and pedestrian path that runs from the edge of Hoyt Lake near the Japanese Garden to the mouth has recently been completed. After PCB remediation work, the banks in this section have been replanted in the disturbed areas but the vegetation is not well developed. Under the expressway and access ramp bridges the banks are steep and mostly bare. These areas have been treated with grass seed, seedlings and 1-2" diameter (6-10 foot tall) tree saplings. Most of the trees and seedlings are failing and the inspectors were unable to determine species by observation. There are several sections under the bridges where slumps and rill and gully erosion are further degrading the banks.

[Map 5 #30] The old outlet of Scajaquada Creek in the background, and the outlet to Black Rock Canal on left

At the mouth of Scajaquada Creek where it meets Black Rock Canal [Map 5 #30], wind and/or current from the canal pushed debris from the canal into the creek for a distance of about 1500 feet on the day it was inspected. A tree lays mid-channel where the stream meets the canal.

Watershed Protection and Restoration Goals

The following watershed management goals have been developed through consensus-building at Scajaquada Creek Watershed Advisory Council meetings based on stream inspections (see report beginning on page 31), public survey results (see pages 23 and 24) and recommendations from technical advisors. These management goals are intended to protect desirable existing conditions and bring about natural resources improvements in the watershed as solutions to concerns defined by stakeholders.

The watershed protection and restoration goals below can be addressed through the series of objectives and management recommendations as outlined on the following pages, and specific action items to be developed from these. The recommendations and action items may be used as a "checklist" and kept current through periodic updates.

Improve Stormwater Management within Scajaquada Creek Watershed

Improve Water Quality in Scajaquada Creek and Tributaries

Improve Wildlife Habitat in Scajaquada Creek and Tributaries

Increase Public Awareness and Participation in Achieving Watershed Management Objectives

Note: Implementation schedules, estimated project costs, and development of community-specific recommendations and action items will be discussed at individual meetings at the municipal level.

Goal: Improve Stormwater Management within Scajaquada Creek Watershed

Objective: Responsible development throughout watershed

Management Techniques

Land use planning and management
Land use planning and management involves a comprehensive planning process to control or prevent certain land uses in areas where beneficial uses of receiving water are sensitive to development. Ideally this type of planning is most effective in undeveloped areas, although opportunities may be available in areas of existing development. The land use planning process involves the following steps: 1) determine water quality goals with respect to human health, aquatic life and recreation; 2) identify planning area and gather pertinent data; 3) determine and prioritize the water quality needs as they relate to land use; 4) develop recommendations for future courses of action to address the problems and needs that have been previously determined; 5) present recommendations to a political body for acceptance and 6) implement adopted recommendations.

Riparian buffers
Vegetated buffers are areas of either natural or established vegetation that are maintained to protect the water quality of neighboring areas. Buffer zones reduce the velocity of storm water runoff, provide an area for the runoff to permeate the soil, contribute to ground water recharge, and act as filters to catch sediment. The reduction in velocity also helps to prevent soil erosion. Vegetated buffers are most effective and beneficial on floodplains, along streambanks, and on steep, unstable slopes. They are also effective in separating land use areas that are not compatible and in protecting wetlands or waterbodies by displacing activities that might be potential sources of nonpoint source pollution.

Soil stabilization measures for construction activities
Soil stabilization measures are any physical, chemical or vegetative method, which prevents or reduces soil erosion. Where possible, existing trees and vegetation in and along streams and vegetative slopes should be preserved during soil disruption activities. Attempts should be made for clearing and grading for periods where erosion is least likely and construction should be performed in phases to minimize the amount of exposed area at any time. Erosion caused by concentrated runoff and eroding streambanks should be identified and stabilized.

Local storm water ordinances
Erosion and sedimentation from construction sites can lead to reduced water quality and other environmental degradation. Municipalities can enact erosion and sediment control ordinances to limit soil disturbance on construction sites. These local regulations are intended to safeguard the public, protect property, and prevent damage to the environment. Ordinances promote the public welfare by guiding, regulating, and controlling the design, construction, use, and maintenance of any development or other activity that disturbs or breaks the topsoil or results in the movement of earth on land. Erosion and sediment control ordinances consist of permit application and review, and they can require a storm water pollution prevention plan, inspections, and enforcement. A model ordinance is available on EPA's web site at *www.epa.gov/nps/ordinance/mol2.htm*.

Recommendations

- Implement buffer ordinances for riparian development in all municipalities within the watershed

Benefit: Protects natural stream function, wildlife habitat and water quality
Cost: Minimal
Responsible Entity: Local municipality
Time frame: Immediate

- Reduce maximum parking lot size zoning

Benefit: Reduced peak stream flows, increased infiltration of rainfall and snowmelt, increased greenspace for aesthetics
Cost: Occasional use of grassed lots or curbside parking
Responsible Entity: Local municipality
Time Frame: Immediate

- Implement Stormwater Pollution Prevention Plans in conjunction with U.S. EPA Phase II Stormwater regulations

Benefit: Reduced peak stream flows, reduced sedimentation in-stream from construction, increased infiltration of rain fall and snowmelt
Cost: Several hundred to several thousand, dependent upon size of project and feasibility of planned practice, contractor assumes cost
Responsible Entity: Local municipalities, MS4s and developers
Time frame: On-going practice

- Implement a local storm water ordinance as recommended by the Stormwater Phase II Regional Coalition

Benefit: Reduced peak stream flows, increased infiltration of rainfall and snowmelt, increased greenspace for aesthetics
Cost:
Responsible Entity: Local municipality
Time Frame: Immediate

Objective: Reduce storm water discharges and restore groundwater recharge

Management Techniques

Storm water infiltration devices
Storm water infiltration basins are any storm water device or system, which causes the majority of runoff from small storms to infiltrate into the ground rather than be discharged to a stream. Most infiltration devices also remove waterborne pollutants by filtering the water through the soil. Storm water infiltration can provide a means of maintaining the hydrologic balance by reducing impervious areas. Infiltration devices could include any of the following: basins, trenches, permeable pavement, modular pavement or other systems that collect runoff and discharge it into the ground.

Structural storm water management practices can be used to achieve four broad resource protection goals. These include flood control, channel protection, ground water recharge, and pollutant removal. The specific design features and methods of treatment differ in each of these designs, but all are improvements on the traditional drainage ditch. These designs incorporate modified geometry and other features for use of the structure as a treatment and conveyance practice. Grassed swales can be applied in most situations with some restrictions and will meet ground water recharge and pollutant removal goals. Swales are very well suited for treating highway or residential road runoff because they are linear practices.

Detention/retention ponds
A dry retention basin is usually dry between storms. It is designed to capture runoff and release it slowly to allow most of the pollutant-laden sediments to settle. Dry retention/ detention basins are used for tributary watersheds 10 acres or larger in size to attenuate peak flow and remove particulates. Dry retention basins treat runoff, collect sediments and accept flood waters. Wet detention ponds are small man-made lakes with emergent wetland vegetation around the banks designed to capture and remove particulate and certain dissolved constituents. Wet ponds are ideal for large, regional tributary areas (10 to 300 acres) where there is a need to achieve high levels of particulate and some dissolved nutrient removal. Wet ponds are among the most cost-effective and widely used storm water practices. While there are several different versions of the wet pond design, the most common modification is the extended detention wet pond, where storage is provided above the permanent pool in order to detain storm water runoff in order to provide settling.

Reduce directly connected impervious surfaces
Utilizing a low impact development plan can reduce directly connected impervious surfaces. Low impact development plans combine a hydrologically functional site design with pollution prevention measures to compensate for land development impacts on hydrology and water quality. The result will be a reduction in storm water peak discharge, a reduction in runoff volume and the removal of storm water pollutants. This can apply to new residential, commercial and industrial developments and sites that are undergoing major redevelopment.

Recommendations

- Disconnect downspouts and sump pump drains from storm sewers and direct flows to detention basins

Benefit: Reduced peak stream flows, increased infiltration of rainfall and snowmelt
Cost: Several hundred to several thousand
Responsible Entity: Landowner
Time Frame: Immediate and on-going

- Install storm water retention systems throughout watershed (including biological systems)

Benefit: Greatly reduced peak stream flows, increased infiltration of rainfall and snowmelt, increased wildlife habitat, aesthetics and recreational opportunities (in retention ponds and wetlands)
Cost: Per structure – from several thousand to several hundred thousand, depending on the type and size of retention structure
Responsible Entity: Local wastewater treatment system operator or POTW
Time Frame: On-going, long-term

- Identify and eliminate illicit stormwater discharges

Benefit: Improved water quality (from polluted discharges), increased pollutant removal
Cost: Per structure – from several hundred to several thousand
Responsible Entity: Landowner (remediation), Local municipality (enforcement)
Time Frame: On-going, long-term

- Install semi-pervious surfaces in minimal use or seasonal-use parking lots

Benefit: Increased infiltration of rainfall and snowmelt, reduced peak stream flows, increased filtering of automotive wastes
Cost: Several hundred to several thousand, depending on size and material (gravel lots, paving stones, etc.), increased maintenance costs (gravel replacement)
Responsible Entity: Developers, shopping plaza management, municipalities
Time Frame: On-going

- Reclaim unused or underutilized impervious surfaces and develop them into community gardens or greenspace

Benefit: Increased recreational opportunities, improved aesthetics, increased wildlife habitat, increased infiltration of rainfall and snowmelt
Cost: Dependent upon size of lot, indirect cost associated with loss of income from commercial sites
Responsible Entity: Local municipalities, land conservation organizations
Time Frame: On-going

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Illicit discharges

Illicit discharge detection and elimination requires 1) the prevention, detection and removal of all physical connections to the storm water drainage system that convey any material other than storm water, 2) the implementation of measures to detect, correct and enforce illegal dumping of materials into streets, storm drains and streams, and 3) implementation of spill prevention, containment, cleanup and disposal techniques of spilled materials to prevent or reduce the discharge of pollutants into storm water. Any industrial discharge not composed entirely of storm water that is conveyed to the storm drainage system or a water body is considered to be an illicit discharge. A discharge of industrial wastewater to a storm sewer is "illicit" because it would ordinarily require a permit under the Clean Water Act. These discharges may contain a variety of pollutants that can affect both public safety and the aquatic environment. Many building owners or operators are not aware that improper connections exist in their facilities. Storm sewer systems are sometimes employed as an inexpensive or convenient alternative to proper disposal of wastewater to treatment plants. An illicit discharge detection program can be an effective method to reduce the quantity of industrial or commercial pollutants that enter the storm drain system.

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● Design grassed filter areas into new developments

Benefit: Reduced peak stream flows, increased infiltration of rainfall and snowmelt, improved aesthetics of development, environmental stewardship and educational opportunity

Cost: Several thousand depending on size and location

Responsible Entity: Developers

Time Frame: On-going

General Storm Water Management Recommendations

Restore pre-development volume of annual average groundwater recharge to maintain base flow and reduce storm flow peaks in streams.

Minimize the generation of storm water and maximize pervious areas for onsite storm water infiltration.

Reduce the volume and velocity of storm water runoff from all sources to levels necessary to protect stream channels from erosion and sedimentation and reduce downstream flooding.

Eliminate concentrated overland flow of storm water or disperse the flow through Best Management Practices prior to reaching streams or wetlands.

Reduce storm water pollutant loads through pollution prevention and storm water filtration.

Infiltrate or discharge storm water within the same sub-basin in which it originates.

Protect 100-year floodplains from further development to allow unimpeded passage of flood flows.

Goal: Improve Water Quality in Scajaquada Creek and Tributaries

Objective: Restore use impairments in Scajaquada Creek and tributaries as designated by NYS Department of Environmental Conservation 1996 Priority Waterbodies List (bathing, fishing, fish propagation and survival, aesthetics)

Management Techniques

Reduce fertilizer runoff and phosphorus discharge
Nitrogen, phosphorus, potassium and other nutrients are necessary to maitain optimum growth of most vegetation. Fertilizer management addresses the proper selection, use, application, storage and disposal of fertilizers. Nutrients that are applied beyond the plant's needs may get washed off the soil and end up in lakes, streams, and wetlands, or may leach into groundwater. When nutrients such as phosphorus run off into surface waters, they can cause algae blooms and excessive aquatic plant growth. Practicing proper fertilizer management will minimize the potential for pollution of surface and ground waters.

Control soil erosion
Soil erosion control is the process of stabilizing soils and slopes in an effort to prevent or reduce erosion due to storm water runoff. Soils can be stabilized by various physical, chemical or vegetative methods, while slopes are stabilized by reshaping the ground to grades which will improve surface drainage and reduce the amount of soil eroding from a site.

Streambank stabilization measures
Streambank stabilization measures work by either reducing the force of flowing water and/or by increasing the resistance of the bank to erosion. Three types of streambank stabilization measures exist. They include: engineered methods, bioengineered methods and biotechnical methods. Engineered structures include riprap, gabions, deflectors and revetments. Bioengineering refers to the use of live plants that are embedded and arranged in the ground where they serve as soil reinforcement, hydraulic drains, and barriers to the earth movement and/or hydraulic pumps. Examples of bioengineering techniques include: live stakes, live fascines, brush mattresses, live cribwall and branch packing. Biotechnical measures include the integrated use of plants and inert structural components to stabilize channel slopes, prevent erosion and provide a natural appearance. Examples of biotechnical techniques include: joint plantings, vegetated gabion mattresses, vegetated cellular grids and reinforced grass systems. Whenever possible bioengineered or biotechnical methods should be implemented in lieu of engineered methods.

Catch basin cleaning
When performed on a regular basis, catch basin cleaning removes pollutants from the storm drainage system, reduces the concentration of pollutants during the first flush of storms, prevents clogging of downstream systems, restores the catch basins' sediment trapping ability and allows the in-system storage capacity of the sewers to be fully utilized. Catch basin efficiency can be improved using inserts, which

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Recommendations

- Implement and enforce pesticide and fertilizer use regulations and develop alternative control methods

Benefit: Reduced chemicals and nutrients in streams, reduced hazards to children and pets, improved water quality and fish habitat
Cost: Community notification, monitoring by law enforcement
Responsible Entity: Local municipality
Time Frame: Immediate and on-going

- Reshape and replant failing streambanks to reduce erosion and sediment deposition

Benefit: Reduced sediment erosion and deposition, improved fish and wildlife habitat, improved water quality
Cost: Several thousand
Responsible Entity: Landowners, county Soil and Water Conservation District, land conservation organizations
Time Frame: Immediate and on-going

- Conduct water quality assessment, including chemical analyses, soil erosion potential, and sediment characterization

Benefit: Provides opportunity to target restoration and cleanup efforts
Cost: Several thousand to several hundred thousand
Responsible Entity: Schools and colleges, local municipality, community groups,
Time Frame: Immediate and on-going

- Conduct feasibility studies on removal of contaminated sediments

Benefit: Provides opportunity to seek funding for removal
Cost: Several thousand
Responsible Entity: NYS Dept. of Environmental Conservation, schools and colleges, local municipality
Time Frame: Immediate and on-going

- Upgrade catch-basin devices to filter storm water and implement regularly-scheduled catch-basin cleanouts

Benefit: Decreased litter, sediment and pollutants in streams, improved water quality, improved aesthetics, decreased threats to wildlife
Cost: Several thousand per municipality, depending on quantity installed
Responsible Entity: Local municipality
Time Frame: Immediate and on-going

- Reduce and strive to eliminate permitted SPDES discharges

Benefit: Improved stream water quality, improved fish habitat
Cost: Several thousand to several hundred thousand
Responsible Entity: Local municipality
Time Frame: On-going, long-term

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can be designed to remove oil and grease, trash, debris, and sediment. Some inserts are designed to drop directly into existing catch basins, while others may require extensive retrofit construction. Benefits of cleaning include increased dissolved oxygen, reduced levels of bacteria, and support of in-stream habitat.

Sewer system cleaning

Sewer system cleaning is particularly beneficial for pipes with grades which are too flat for self-cleaning velocities to be achieved on a regular basis. Cleaning the systems helps to remove pollutants and will ensure that the pipes convey their intended design flow, as well as allowing the in-system storage capacity of the sewers to be fully utilized. The removal of deposited material can be accomplished with vactors, jetters, and scrapers or by flushing with water. Removal material needs to be captured so it does not discharge to the stream.

Street sweeping

When performed regularly, street sweeping can remove 50-90% of street pollutants including fertilizer runoff that can potentially enter surface waters through runoff. Street sweeping can also make road surfaces less slippery during light rains, improve aesthetics by removing litter and control pollutants which can be captured by the equipment.

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- Reduce accumulation of litter and debris in streams and along streambanks throughout watershed through increased street sweeping and volunteer cleanups

Benefit: Increased awareness of environment, decreased litter, sediment and pollutants in streams, improved water quality, improved aesthetics, decreased threats to wildlife
Cost: Range from no cost to several thousand
Responsible Entity: Local municipality, community groups, schools
Time Frame: Immediate and on-going

√ Action Item: **Replace railing along footpath at Grant Street finger dam**

Benefit: Decreased over-bank debris dumping, especially large items such as shopping carts, bicycles, tires; improved aesthetics; improved water quality; decreased threats to aquatic wildlife; increased safety to pathway users
Cost: $14,000 — Community Development Block Grant
Completed September 2002 by Buffalo Urban Renewal Agency

Action Item: **Install debris-collecting grates at Pine Ridge Road tunnel entrance**

Benefit: Reduced debris entering tunneled section and reduced potential for local flooding at Hoyt Lake trash rack
Cost: Several thousand
Responsible Entity: Local municipality
Time Frame: Immediate

Objective: Abate Combined Sewer Overflows and Sanitary Sewer Overflows

Management Techniques

Storm water storage facilities
Storm water storage facilities are source control devices to retard flow sufficiently to reduce sewer overflows, prevent downstream flooding and/or reduce erosive velocities. These facilities consist of storage tanks connected to the existing drainage system, street storage and parking lot storage. Retrofitting storage into existing drainage systems is usually very expensive. Improperly sized and sited storage facilities can also cause localized parking lot and street flooding, icing in winter months and increased downstream flooding.

Identify and eliminate Sanitary Sewer Overflows
Sanitary sewer overflows (SSOs) involve the release of raw sewage from a separate sanitary sewer system prior to reaching a treatment facility. The raw sewage from these overflows contains bacteria and nutrients that affect both human and environmental health. Raw sewage often contains pollutants and toxics that impact the aquatic environment by limiting dissolved oxygen levels and promoting algal blooms. These overflows occur when the flow into the system exceeds the design capacity of the conveyance system, resulting in discharges into basements, streets, and streams. While SSOs can occasionally occur in any system due to factors such as flooding or temporary blockages, chronic overflows are an indicator of a deteriorating system or a system where development has exceeded capacity. The elimination of SSO sources can have a significant impact on water quality. Blockages, breaks, and infiltration and inflow in municipal sewer systems create overflows that represent a significant risk to humans and the environment.

Identify and eliminate untreated CSOs
Combined sewers carrying sewage and rainwater are often overburdened during storms, and the excess combined sewage and rainwater is discharged directly into streams or other receiving waters. As sewer districts become more built out, the burden increases. Increases in impervious surfaces such as rooftops, parking lots and roadways deliver more rainwater to the sewers. An increase in the number of users in the sewer district also increases loading to the system. Many solutions to reducing CSOs include: storm water retention basins, downspout disconnects, porous pavement, swales and filter strips, and in-system storage tanks.

Maintain and enhance sewer system infrastructure
Infrastructure maintenance includes the upkeep of sanitary sewer lines in order to prevent sewage from flowing into surface waters. Maintenance involves regular inspections of the piping to locate partial blockages before they backup wastewater into basements or onto the surface, to locate pipe failures which could cause illicit discharges and/or locate cross connections between the sanitary and storm systems. Maintenance personnel can perform inspections by actually walking the sewers or using a video camera to document the sewer's condition.

Recommendations

- Increase local pre-treatment storage capacity

Benefit: Reduced or eliminated sewer overflows locally, improved water quality, improved aquatic wildlife habitat, improved aesthetics (odor), reduced peak stream flows
Cost: Up to several hundred thousand
Responsible Entity: Local municipality or wastewater treatment system operator
Time Frame: On-going, long-term

- Identify and eliminate illicit discharges

Benefit: Reduced or eliminated sewer overflows locally, improved water quality, improved aquatic wildlife habitat, improved aesthetics (odor), reduced peak stream flows
Cost: Up to several thousand
Responsible Entity: Local municipality or wastewater treatment system operator
Time Frame: Immediate, on-going, long-term

- Reduce and strive to eliminate sanitary sewer overflows

Benefit: Reduced or eliminated sewer overflows locally, improved water quality, improved aquatic wildlife habitat, improved aesthetics (odor), reduced peak stream flows
Cost: Up to several hundred thousand
Responsible Entity: Local municipality or wastewater treatment system operator
Time Frame: Immediate, on-going, long-term

- Improve sewer pipelines to reduce leakage

Benefit: Reduced contamination of groundwater, improved stream water quality
Cost: Several thousand to several hundred thousand
Responsible Entity: Local municipality or wastewater treatment system operator
Time Frame: On-going, long-term

- Monitor outfalls and implement public notification system when pathogen levels exceed established EPA toxicity standards

Benefit: Reduced human health risks
Cost: Several thousand
Responsible Entity: Local municipality or wastewater treatment system operator
Time Frame: On-going, long-term

Goal: Improve Wildlife Habitat in Scajaquada Creek and Tributaries

Objective: Restore plant and animal diversity and sustainable populations throughout the watershed

Management Techniques

Developing greenspace and wildlife habitat

Open space is an important feature of a watershed, providing wildlife habitat, groundwater recharge, pollutant filtration, recreational opportunities, etc. Abandoned or unused property can be reclaimed for greenspace, increasing neighborhood property values as well as beautifying the landscape and creating habitat for wildlife. Invasive or unwanted plants may populate newly created open spaces, therefore it is important to plant native vegetation where feasible. Riparian buffers also provide excellent wildlife habitat for aquatic and terrestrial species, and also increase biological diversity and protect streambanks.

Habitat restoration techniques

Habitat restoration techniques include in-stream structures that may be used to correct and/or improve animal habitat deficiencies over a broad range of conditions. Examples of these techniques include: channel blocks, boulder clusters, covered logs, tree cover, bank cribs, log and bank shelters, channel constrictors, cross logs and revetment, and wedge dams. The majority of these structures must be installed with hand labor and tools. After construction, a maintenance program must be implemented to ensure long-term success of the practice.

Preserve and enhance existing wetlands

Wetlands serve as giant sponges, which soak up storm water during wet weather events, allowing the water to infiltrate the soil instead of running off directly to surface waters. As the storm water infiltrates the soil, pollutants are filtered out before it reaches groundwater. Wetlands serve to reduce storm water velocities, reduce peak flows, increase base flows and to filter out storm water pollutants. They also provide habitat for numerous wildlife species.

Reducing geese populations

Society's desire for lush green lawns and onsite storm water retention that is not designed to limit preferable goose habitat has created an unlimited food and water source that has attracted the geese population. Although this habitat is ideal for the geese, it is usually undesirable for human recreation. Geese require large quantities of food, which creates a large volume of feces that introduce excess nutrients into waterbodies, in turn leading to algal blooms. Geese populations can be controlled by a public effort, landscape design and/or goose relocation. The public education effort usually takes the form of "Don't Feed the Geese" signs and has limited value. Landscape design involves creating an environment that is unfavorable to geese yet favorable to humans. Leaving a buffer of unmowed vegetation on streambanks and around ponds usually deters geese from congregating in those areas. This is a fine line to walk and it loses its effectiveness as the geese adapt.

Recommendations

- Reduce populations of non-native invasive plant species along streambanks and plant native riparian species with a goal to eliminate non-native vegetation

Benefit: Improved wildlife habitat, increased biological diversity, improved aesthetics, increased streambank erosion control
Cost: Several hundred to several thousand for plant materials, labor force could be volunteer
Responsible Entity: Municipalities, community groups, landowners, land conservation organizations, schools
Time Frame: Immediate and on-going

- Provide incentives for landowners to restrict development of greenspace

Benefit: Protection of wildlife habitat, protection of aesthetically pleasing landscape, protection of storm water management areas
Cost: Several thousand to several hundred thousand depending on type of land conservation program
Responsible Entity: Local municipalities, land conservation organizations
Time Frame: Immediate and on-going

- Preserve existing wetlands and greenspace and create greenspace on reclaimed properties

Benefit: Protection of wildlife habitat, protection of aesthetically pleasing landscape, protection of storm water management areas
Cost: Several hundred to several thousand depending on size of wetland and type of remediation work needed
Responsible Entity: Local municipalities, land conservation organizations, developers
Time Frame: Immediate and on-going

- Reduce overpopulated species such as Canada goose, Mallard duck, rat, muskrat

Benefit: Protection and restoration of water quality, protection of human health (with reduction of rat population), streambank erosion control, increased enjoyment of streamside recreation space, improvement in health of wildlife populations
Cost: Several thousand
Responsible Entity: Local municipalities, landowners, schools and community groups, land conservation organizations
Time Frame: Immediate and on-going

Goal: Increase Public Awareness and Participation in Achieving Watershed Management Objectives

Management Techniques

Public participation programs

Public participation and education programs are activities where people learn about and/or work together to control storm water pollution and other environmental protection activities. These programs are based on the following four objectives: 1) promote a clear identification and understanding of the problem and solutions, 2) identify responsible parties, 3) promote community ownership of the problems and solutions and 4) integrate public feedback into program implementation. To achieve these objectives the audience needs to be identified, the program carefully designed and the program effectiveness periodically reviewed. Public participation/education programs can include the following activities: Public surveys, program development, newsletters, fact sheets, brochures, posters, coordinating committees, press releases, public service announcements, storm drain stenciling, home toxics projects, environmental booths and speakers, workshops, green business projects, environmental certifications, point of purchase displays and materials, school presentations, contests and curriculum.

Citizen monitoring can provide important data and information during the development of a storm water program. These data help determine what management practices and strategies are most appropriate for a particular community or set of issues. State and local agencies can use volunteer data to delineate and characterize watersheds, screen for water quality problems, evaluate the success of best management practices, and measure baseline conditions and trends. Financial support for these programs might come from government grants, partnerships with businesses, endowments, independent fund-raising efforts, corporate donations, membership dues, or a combination of these sources.

Litter and debris cleanups

Litter and debris cleanup can be achieved through adopt-a-road and adopt-a-stream programs. Community organizations, schools, scout troops, churches and private companies can pledge to collect debris along local, county and state roads and stream banks and channels. This effort is coordinated with the local, county or state highway departments and trash haulers, who will remove the collected debris for proper disposal.

An effective way to promote storm water awareness is to host a stream cleanup. Many people are unaware that most storm drains discharge untreated waters directly into local waterbodies. Many programs have experts on hand at the event to discuss the stream's ecology and history. As a result, the stream is cleaner, volunteers feel a sense of accomplishment, and the community at large is better informed. These efforts help citizens feel more involved in

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Recommendations

- Organize events and solicit participation from community groups, scout troops, schools

Action Item: **Continue Earth Day cleanup and expand to include remainder of the stream and increase frequency of cleanup activities**

- Pursue funding for public education projects, workshops, direct mailings, etc.

- Increase public awareness through media announcements, newspaper articles and photos

- Conduct technological workshops for municipal officials and public works personnel and further develop watershed management planning objectives

Action Item: **Continue to foster current partnerships and create new ones to meet watershed management goals**

- Conduct informational workshops for homeowners

- Develop and implement an environmental stewardship program with incentives such as photo acknowledgment in local papers, on-site signage for homeowners, businesses, neighborhood groups, schools, church groups, etc.

- Provide watershed improvement loans to landowners to repair/replace failing septic systems; remove underground fuel tanks; construct retention basins, swales and landscape buffers; replace/add roof drainage systems, etc.

- Promote recreational uses of natural resources throughout the watershed, and protect those uses currently in place

Benefit: Increased public involvement in stream protection activities
Cost: Minimal to several thousand
Responsible Entity: Environmental organizations, community groups, local municipality
Time Frame: Immediate, on-going

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their community and foster a sense of responsibility for the water resources in their community. In addition to trash and debris removal, media coverage of the program or cleanup event can increase public awareness of storm water issues. Volunteer groups can provide additional benefits by taking note of areas where structure and streambank maintenance is needed.

Environmentally friendly lawn and garden care

Proper lawn and garden maintenance involves a combination of mechanical methods and careful application of chemicals. Mechanical methods include the proper selection of vegetation and native plants for various land uses; proper watering techniques to reduce runoff and excess transpiration; proper lawn mowing techniques to reduce the runoff rate and pollutant transport; proper organic debris disposal and proper pest control techniques to minimize the use of herbicides and insecticides. Particular maintenance techniques are required on steep slopes, in and around drainage channels, streams and detention basins, and adjacent to catch basins. This practice should be carried out through public education efforts on non-point source pollution and/or through regulations requiring licensing for landscaping and lawn care professionals.

Tools for Watershed Protection

Watershed protection certainly has environmental benefits, but there are economic benefits as well. Well-planned and coordinated activities on a local and regional level can be cost-effective solutions to watershed protection concerns. The ability to implement watershed management objectives relies on the availability of funding sources and on the perseverance of project managers (municipalities and organizations). Implementing the Watershed Management Plan will result in significant costs, but remediation costs would far outweigh a proactive approach to natural resources protection.

Riparian corridor zoning to control development in sensitive floodplain areas can result in higher property values on adjacent sites, improving the local tax base. Land uses that preserve open space add a quality-of-life value to the community. Planting trees along streams and in green spaces can revitalize neighborhoods as well as provide recreation areas and wildlife habitat and protecting water resources. Riparian buffers in permanent vegetation reduce drainage and flooding complaints to public works departments, and reduce mowing and maintenance costs.

Developing green space and waterways for recreation assists the local economy by attracting visitors to the community and its businesses.

Community Benefits of Stream Protection:

- **Safer drinking water supply**
- **Increase in property values**
- **Reduced threats to property from streambank erosion**
- **Healthier wildlife habitat**
- **Improved aesthetics and image**
- **Flood retention**
- **Safer environment for children**
- **Better opportunities for swimming, fishing and boating**

Best Management Practices (BMPs) for stormwater management such as wet detention basins, wetlands, filter systems or swales can be expensive watershed protection tools, but they can provide several measurable economic benefits. Many bioretention areas such as swales or filter areas are less expensive to install and maintain than traditional storm drain systems and have the added benefit of removing pollutants. Wetlands and ponds create aesthetically pleasing sites that will increase property values and reduce infrastructure costs.

Restoring stream channel access to protected floodplains is a well-accepted method of reducing downstream flood damage and minimizing localized channel erosion, often at far less cost than channelization and armoring alternatives.

Municipalities can save tax dollars by sharing services, working together to solve common problems, and combining watershed management implementation projects. Watershed protection programs such as monitoring, inspection of treatment systems, hazardous waste collection or stormwater management can be funded by the local community through stormwater utilities. The average residential stormwater utility fee is only thirty dollars per year.

Several programs and concepts are available to assist natural resources planners. Community Environmental Management and Smart Growth are two examples of the tools developed to guide land use planning and natural resources management.

Community Environmental Management
cem@ecswcd.org

Community Environmental Management (CEM) is a comprehensive community-based program that when used by professional staff, community officials, and/or concerned groups of citizens can identify, evaluate, and prioritize natural resource concerns, (on a watershed, community, or site-specific scale) and then provide guidance and resources to help address those concerns. The CEM program uses a multi-tiered approach that includes assessments, data gathering, community visioning, consensus building, inter/ intra agency cooperation, strategy building, implementation, and monitoring mechanisms to address past, present, and future natural resource allocation.

CEM focuses on preventing or mitigating nonpoint sources of pollution by analyzing land use and water quality issues within a study area. All land use decisions impact water quality. Many water quality issues impact land use decisions. By examining a wide variety of resources/ practices including flooding, zoning, wetlands, stormwater, highway maintenance, onsite waste treatment, sprawl, streambanks, mining, planning, and marinas, CEM provides a framework for shifting both a community's vision and it's daily practices.

Smart Growth
www.smartgrowth.org

The concept of Smart Growth is building momentum across the country. The basic principles focus on partnerships, problem solving and place: people of various interests taking action together to develop comprehensive plans to implement appropriate solutions for a specific geographic area. Smart Growth is a local, grassroots initiative based on the assumption that growth will occur, but it can be accommodated in ways that make sense and preserve the community, protect the environment and enhance economic vitality. Smart Growth seeks to identify a common ground where developers, environmentalists, public officials, citizens and financiers all can find ways to accommodate growth that is acceptable to all parties.

Nonpoint Education for Municipal Officials
www.nemo.uconn.edu

Nonpoint Education for Municipals (NEMO) is an educational program for local land use officials that addresses the relationship of land use to natural resource protection. The key target audience is local officials making land use decisions. NEMO programs function on the basis that research-based, non-advocacy professional outreach education is the best way to foster better land use decisions.

Funding Sources and Technical Assistance

American Rivers- NOAA Community Based Restoration Program Partnership Grants
Peter Raabe, River Restoration Finance Associate
American Rivers
1025 Vermont Avenue, NW, Suite 720
Washington DC 20005
Email: rivergrants@amrivers.org

Buffalo Olmsted Parks Conservancy
84 Parkside Avenue
Buffalo NY 14214
Phone: (716) 838-1249
Gary Carrel—gcarrel@buffaloolmstedparks.org
www.buffaloolmstedparks.org

Buffalo State College
Department of Geography and Planning
1300 Elmwood Avenue
Buffalo NY 14222
Dr. Kelly M. Frothingham—frothikm@buffalostate.edu
Streambank stabilization and physical habitat/stream morphology linkages
Phone: (716) 878-6736 Fax: (716) 878-4009

Buffalo State College
Great Lakes Center
1300 Elmwood Avenue
Buffalo NY 14223
Dr. Shreeram Inamdar—inamdasp@buffalostate.edu
www.buffalostate.edu/orgs/glc/faculty/inamdar.htm
Watershed modeling, watershed remediation
Phone: (716) 878-4329 Fax: (716) 878-6644

The Center for Watershed Protection
A non-profit corporation that provides local governments, activists, and watershed organizations with strategies for watershed protection that encompass watershed planning, watershed restoration, stormwater management, watershed research, better site design, education and outreach, and watershed training.

8391 Main Street
Ellicott City, MD 21043-4605
Phone: (410) 461-8323 Fax: (410) 461-8324
E-mail: center@cwp.org

City of Buffalo Department of Public Works
City Hall, Room 502
65 Niagara Square
Buffalo NY 14202
Joseph N. Giambra, Commissioner
Phone: (716) 851-5636 Fax: (716) 851-4201
jgiambra@city-buffalo.com
www.city-buffalo.com
Services include maintenance of Delaware Park area

Community Environmental Management
Joseph Ghosen
CEM Coordinator
c/o Erie County Soil and Water Conservation District
50 Commerce Way
East Aurora NY 14052
Phone: (716) 652-8480 Fax: (716) 652-8506
Email: cem@ecswcd.org

Ecology and Environment, Inc.
368 Pleasantview Drive
Lancaster NY 14086
Phone: (716) 684-8060 Fax: (716) 684-0844
Full service environmental consulting firm
Paul Fuhrmann—pfuhrmann@ene.com
www.ene.com

Erie County Department of Environment and Planning
Providing technical assistance, education and outreach, regulatory information. Projects include general watershed planning, habitat restoration, public outreach and education.

95 Franklin Street
Buffalo NY 14202
Jill Spisiak-Jedlicka—Room 1077
Phone: (716) 858-8846 Fax: (716) 858-7713
spisiakj@erie.gov

Erie County Soil and Water Conservation District
50 Commerce Way
East Aurora NY 14052
Phone: (716) 652-8480 Fax: (716) 652-8506
Email: info@ecswcd.org
Working with landowners, land managers, local government agencies and other local interests in addressing natural resource concerns, including streambank protection; wildlife and fisheries habitat management; watershed management; Agricultural Environmental Management; erosion and sediment control and stormwater management; resource mapping and interpretation; and conservation education.

Friends of the Buffalo Niagara Rivers, Inc.
601 West Ferry St.
Buffalo, New York 14222
Phone: (716) 523-2423
info@fbnr.org

Great Lakes Commission
The Commission addresses a range of issues involving environmental protection, resource management, transportation and economic development.

Eisenhower Corporate Park
2805 S. Industrial Hwy, Suite 100
Ann Arbor MI 48104-6791
Phone: 734-971-9135 Fax: 734-971-9150
www.glc.org

Great Lakes Protection Fund
1560 Sherman Avenue, Suite 880
Evanston IL 60201
Phone: (847) 425-8150
www.glpf.org

Great Lakes United
Cassety Hall
Buffalo State College
1300 Elmwood Avenue
Buffalo NY 14260
Phone: (716) 886-0142
Margaret Wooster—wooster@glu.org
Maria Maybee—mmaybee@glu.org

Low Impact Development Center
Balancing growth and environmental integrity, The Low Impact Development Center, Inc. is a non-profit organization dedicated to research, development, and training for water resource and natural resource protection issues.

7 Old Gate Court
Rockville MD 20852
Email: nweinstein@lowimpactdevelopment.org

NYS Department of Environmental Conservation
Buffalo Regional Headquarters
270 Michigan Avenue
Buffalo, N.Y. 14203-2999
Phone: (716) 851-7200
www.dec.state.ny.us

Nonpoint Education for Municipal Officials (NEMO)
NEMO: Middlesex County Extension Center
1066 Saybrook Rd. BOX 70
Haddam, CT 06438
Phone: (860) 345-4511 Fax: (860) 345-3357
Email: www.nemo.uconn.edu

Partners for Urban Resources and the Environment—Erie/Niagara
City Hall, Room 913
65 Niagara Square
Buffalo NY 14202
Darlene Vogel—urpbflo@ch.ci.buffalo.ny.us
Phone: (716) 851-5635

River Network
Providing technical assistance, information, funding, and other types of support to individuals, organizations, agencies, tribal governments, and others.

520 SW 6th Avenue #1130
Portland, OR 97204
Phone: 503-241-3506 or 1-800-423-6747
Fax: 503-241-9256
www.rivernetwork.org

Smart Growth
www.smartgrowth.org

Stormwater Manager's Resource Center
The Stormwater Manager's Resource Center is designed specifically for stormwater practitioners, local government officials and others that need technical assistance on stormwater management issues. Created and maintained by the Center for Watershed Protection, the SMRC has everything you need to know about stormwater in a single site: http://www.stormwatercenter.net

Stormwater Phase II Regional Coalition
Erie County Department of Environment and Planning
95 Franklin Street
Buffalo NY 14202
Thomas Hersey—hersey@erie.gov
Phone: (716) 858-7583
Assistance to municipalities and MS4s with compliance with USEPA Phase II Stormwater Final Rule.

USDA Natural Resources Conservation Service
50 Commerce Way
East Aurora NY 14052
Phone: (716) 652-8480 Fax: (716) 652-8506
Email: john.whitney@ny.usda.gov
Providing technical expertise in the solution of agricultural and related types of non-point source pollution, responsible for engineering and agronomic practices to farmers, design of measures funded by the Environmental Quality Incentives Program, and farm compliance with the conservation provisions of the federal farm bills.

US Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds
www.epa.gov/owow/
Phase II NPDES Storm Water Program
cfpub.epa.gov/npdes/stormwater/swphase2.cfm

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Scajaquada Creek Watershed Advisory Council Technical Committee:

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Pat Goodwin	Town of Cheektowaga Conservation Advisory Council
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David Kubek	Erie County Soil and Water Conservation District
Maria Maybee	Great Lakes United, Great Lakes Aquatic Habitat Network
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Darlene Vogel	Partners for Urban Resources and the Environment – Erie/Niagara
John Whitney	USDA Natural Resources Conservation Service

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