



**Green Infrastructure  
Rapid Assessment Plan  
Four Mile Creek Watershed**

**Prepared by:**

**The Stormwater Coalition of Monroe County and  
Monroe County**

**Department of Environmental Services**

**Prepared for:**

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Special acknowledgement needs to be given to the Center for Watershed Protection. Staff conducting this Report relied heavily on the concepts and strategies provided by the Center in its Urban Subwatershed Restoration Manual Series (CWP, 2004) and other reports and studies conducted by the Center

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# List of Abbreviations

cfs	cubic feet per second
CWP	Center for Watershed Protection
EPA	US Environmental Protection Agency
GI	Green Infrastructure
GIS	Geographic Information System
GPS	Global Positioning System
IC	Impervious Cover
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
POC	Pollutant of Concern
SWAAP	Stormwater Assessment and Action Plan
Wq	Water Quality
WS	Watershed
USGS	US Geological Survey

# **Section 1. Assessment Overview**

## **1.1 PROBLEM STATEMENT:**

Similar to many developing areas, growth in Monroe County has caused some unfortunate consequences to water quality. One consequence is that developed areas shed larger volumes of stormwater from impervious surfaces (roads, buildings and parking lots) than natural landscapes. Because there is more volume, there is more pollution. Typical pollutants include: petroleum products and heavy metals from vehicles; fertilizers, chemicals and animal waste from lawns; and, sediment from eroded streambanks, construction sites and roadways.

A second consequence is that streams more frequently flow full or overtop their banks. High stormwater flows can cause flooding, damage property, and harm fish and wildlife habitat. Common damages from high flows include eroded stream banks, wider and deeper stream channels, and excessive sediment deposition. This degradation results in poor water quality and added maintenance costs to municipalities and property owners. In Monroe County, stormwater pollution and associated wet weather flows have harmed virtually all urban streams, the Genesee River and Lake Ontario's shoreline.

## **1.2 PURPOSE:**

Developing plans to improve our impacted water resources is the objective of the Rapid Green Infrastructure Assessment Plan (Plan). A method was devised to quickly evaluate multiple watersheds for stormwater retrofit potential. The main product is a ranked inventory of retrofit projects that, if constructed, may substantially improve water quality and stream health. Also, flow attenuation may reduce erosive storm flows and localized drainage problems. The Plan is a simplified version of more detailed Stormwater Assessment and Action Plans being done in other parts of Monroe County. These larger studies include water quality sampling as well as modeling the effects of the current watershed's condition and the potential improvement from proposed retrofits. The field work completed for this report was kept to a minimum and only a summary report is produced (herein). The project was conducted with funding from New York's Environmental Protection Fund, the Monroe County Department of Environmental Services, and the Stormwater Coalition of Monroe County.

### 1.3 SETTING:

Four Mile Creek has a 12,000 acre watershed that lies within Monroe and Wayne counties. The Creek begins in the north central area of the Town of Penfield and flows north, into the Town of Webster. The eastern portion of the watershed lies in Wayne County (Figure 1) It continues to flow north until it empties into Lake Ontario, near the intersection of Lake Road and Webster Road.

Residential land use makes up approximately 37% of the watershed, the largest portion compared of any other single land use (Table 1). While residential land use constitutes the largest percentage of the watershed, there was a lack of older residential sub-divisions, ie predating 1975. This may indicate that current residential land use is relatively recent and therefore some basic green infrastructure and stormwater management is already in place. Agricultural and vacant land use account for the second and third largest land uses, 23% and 21% respectively. Agricultural land use is especially prevalent in the upper and mid-reaches of the watershed as well as the portion of the watershed in Wayne County. Figure 2 shows watershed land use based on the property class description. This data was not readily available for the Wayne portion of the watershed.

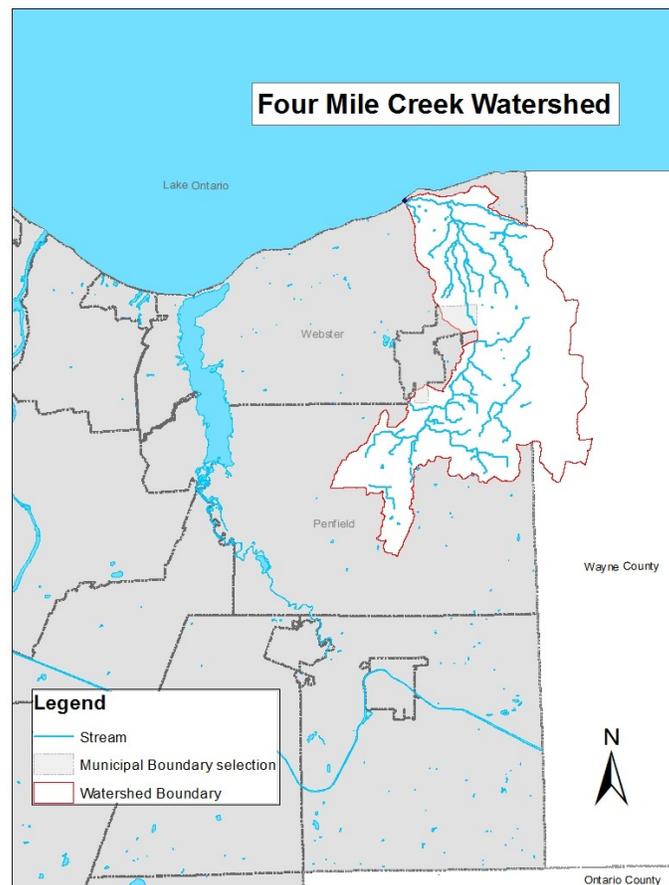


Figure 1: Four Mile Creek Watershed.

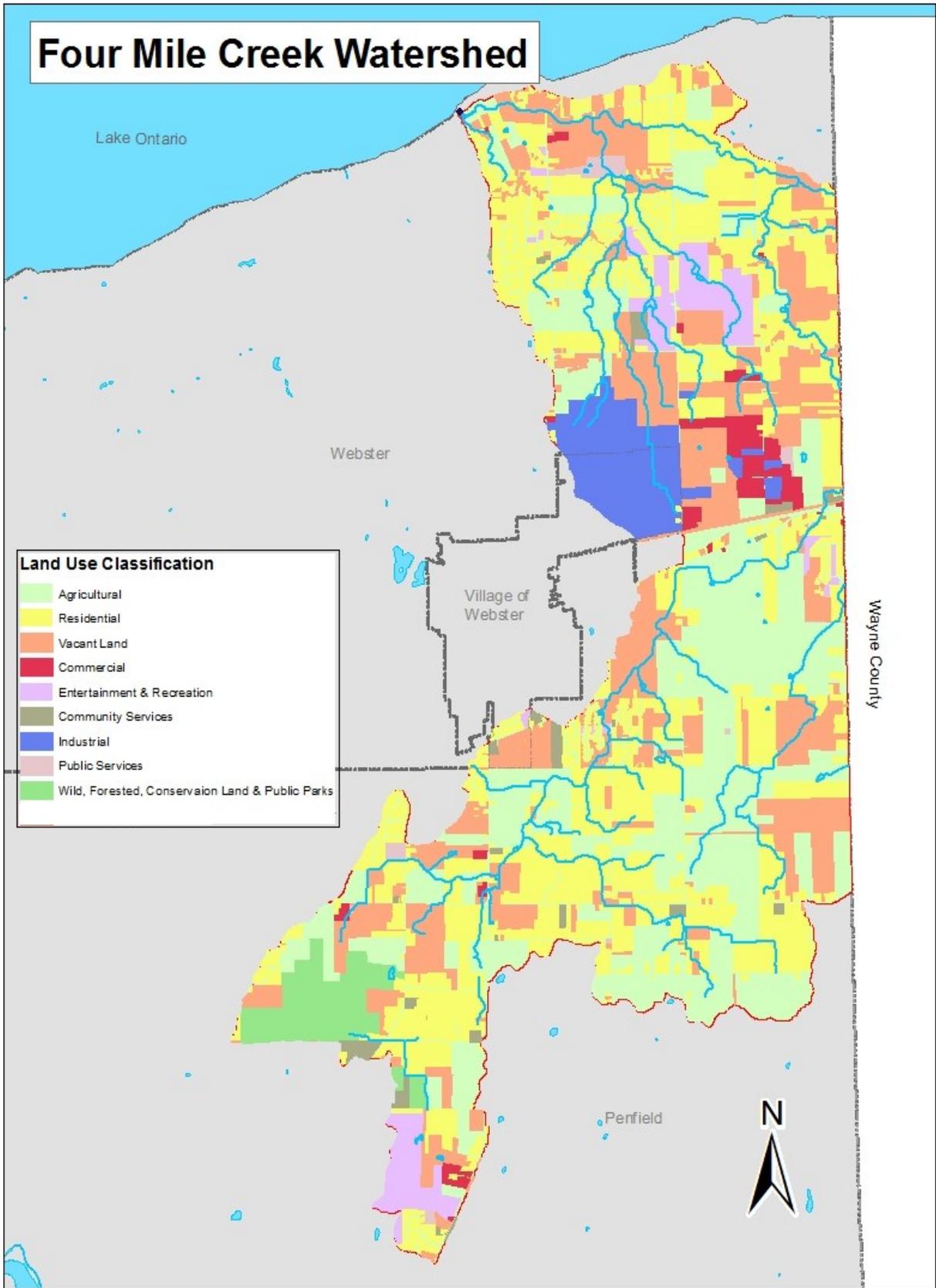


Figure 2: Four Mile Creek Watershed Land Use

**Table 1. Watershed Data for Four Mile Creek (Within Monroe County)**

<b>Metric</b>	<b>Value</b>
Area	12,080 Acres
Mapped Stream Length	49.6 Miles
Percent of Stream Channelized	≈ 9%
Primary/secondary land use	Residential, Agricultural, Vacant
Land Use (percent of watershed)	
Agricultural	23
Residential	37
Vacant Land	21
Commercial	2
Recreation & Entertainment	5
Community Service	2
Industrial	5
Public Services	1
Wild, Forested, Conservation Lands & Public Parks	4
# of Stormwater Treatment Ponds	≈ 28 (that were located)
# of Stormwater Outfalls	203
Current Impervious Cover (%)	≈ 15%
Estimated Future Impervious Cover (%)**	≈ 21%**
Wetland acres	≈ 816
Municipal Jurisdiction	Webster 60%, Penfield 40%

\*\*Based on current zoning, future impervious cover (over the next 10 years) will increase by percent.

#### **1.4 WATERSHED CHARACTERISTICS:**

**1.4.1 Water Quality Concerns** In 2010 the Creek was added to the NYS Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy. The listing states that Four Mile Creek is impaired for aquatic toxicity and that the source is unknown. Future development of a TMDL is deferred pending verification of the cause of the impairment. There is no known water quality monitoring data at this time.

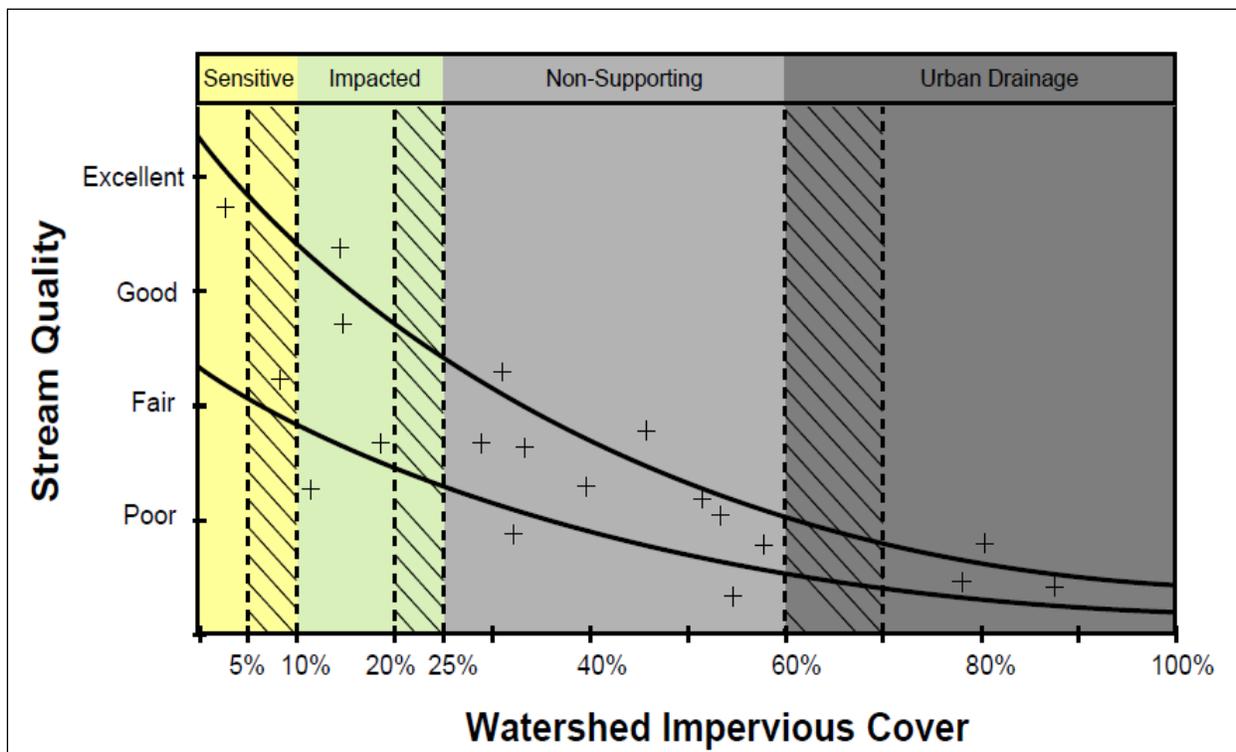


Figure 3: Impervious Cover Model

**1.4.2 Impervious Cover Analysis** -The Center for Watershed Protection created the “Impervious Cover Model” (ICM) to predict a typical stream’s health using the relationship between subwatershed impervious cover and stream quality indicators. This models accuracy has have been confirmed by nearly 60 peer-reviewed stream research studies (Figure 3) . The ICM shows stream quality decline becomes evident when the watershed impervious cover exceeds ten percent. Four Mile Creek has an average of 15% impervious cover, identifying stream quality somewhere between poor/fair and good, indicating that the stream is impacted.

**1.4.5 Soils** - A simplistic yet useful way to define how much stormwater runs off the pervious land surface is to determine soils’ infiltration capabilities, or their ability to absorb stormwater. Soil scientists have categorized soils into four categories, A through D. A and B soils are well drained and absorb much of the stormwater that drains on or over them. C and D soils are more poorly drained. However, the soils in some parts of this watershed are not categorized, denoting areas that have been so altered by land development that grouping a specific soil type is not feasible. The amount of each soil type within the Four Mile Creek watershed is: A soils 1%; B soils 48%; C soils 27%; D soils or not verified 24% (Figure 4).

The large percentage of B soils will allow for infiltration-type stormwater retrofits. These practices installed in the upper parts of the watershed may prevent and reduce flooding, drainage problems, and streambank erosion down stream from the retrofit locations. Preventing or reducing these types of issues can improve water quality in the Four Mile Creek watershed.

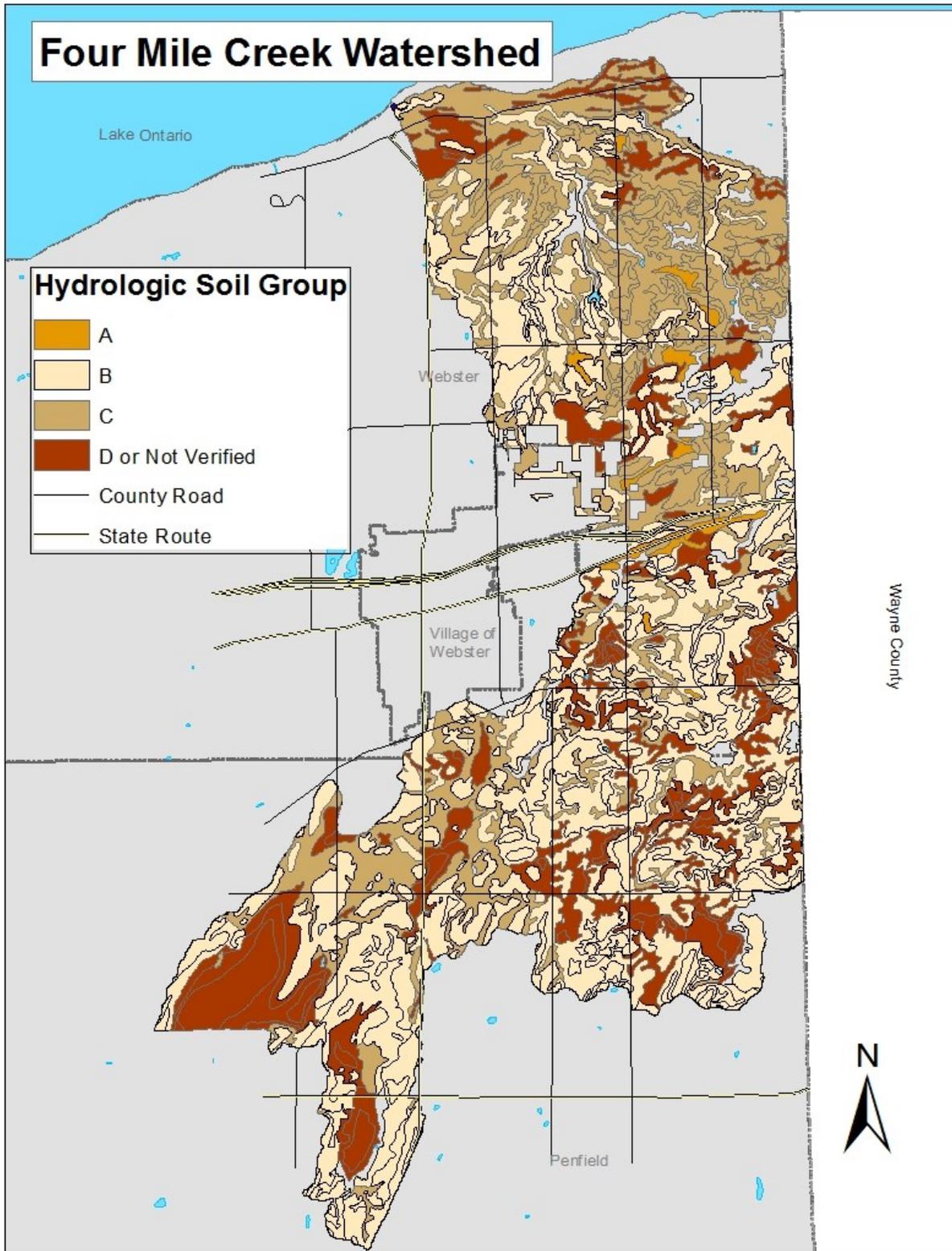


Figure 3: Four Mile Creek Watershed Hydrologic Soils

## Section 2. Retrofit Inventory

An inventory of potential retrofit sites was generated using GIS mapping tools to locate public properties, stormwater practices like ponds, old urban areas (built before stormwater management requirements) and, pervious soil areas. Next, the appropriate stormwater management practice was determined for the properties identified and were ranked based on their feasibility, how much they would improve water quality and, cost effectiveness. While the stormwater management practice types focused on green infrastructure (stormwater volume-reducing practices such as infiltration), project types include retrofitting stormwater ponds as a highly cost-effective practice. Stormwater pond projects rank well and are a recommended component of watershed restoration. Complete details of methods used to complete the rapid assessment and retrofit ranking is explained in a reference document titled “Assessment Methodology, Project Descriptions, and Retrofit Ranking Criteria For Monroe County Green Infrastructure Rapid Assessment Plans”.

Two broad categories of retrofit project types were considered:

1. New stormwater ponds, upgrades to existing stormwater ponds and adding stormwater storage to existing drainage channels.
2. Green Infrastructure (GI). This category was divided and ranked by where a GI project might be installed and includes:
  - Public Right of Ways,
  - Older Residential Neighborhoods, and
  - Other Locations (such as areas with large impervious surfaces ie shopping malls)

Green infrastructure projects can be installed on private property as well as in the right of way on neighborhood streets, major roadways, and highways. These types of projects involve the modification of concrete channels and stormwater conveyance systems. Green infrastructure projects on private property involve the installation of rain gardens to capture and retain roof runoff. Figure 5 shows project locations and project numbers within the watershed. Table 2a and 2b lists project addresses and how they scored.

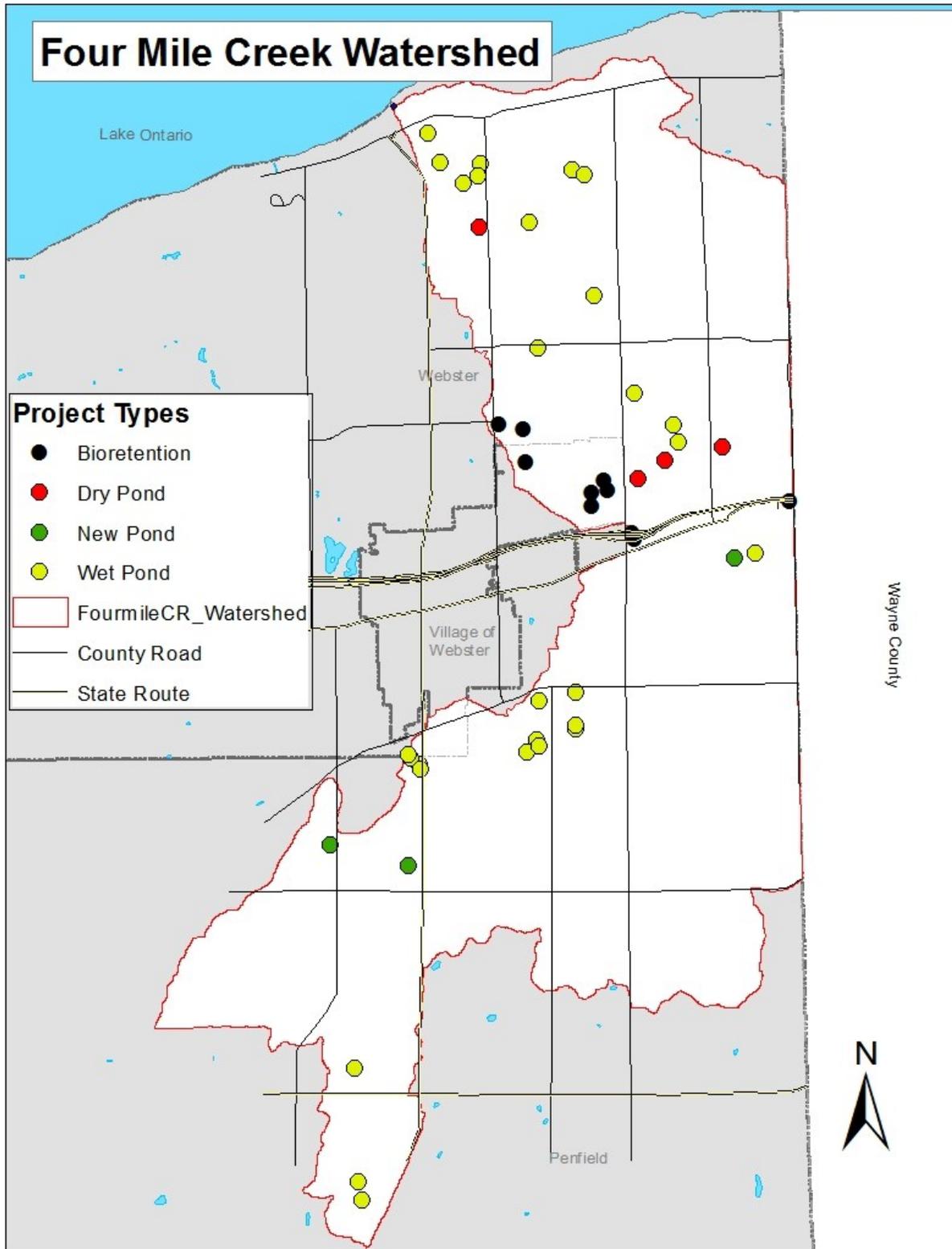


Figure 4: Four Mile Creek Watershed Project

**Table 2a: Four Mile Creek Retrofit Ranking List**

Map I.D.	Project Type	Overall Rank	Project Location	Feasibility	Watershed Benefits	Cost Effectiveness	Score
W12	Wet Pond	1	3180 Atlandtic Ave	5	I, FS, WQ, CP, E	3	14
N1	New Pond	2	Behind 1803 Ridge Road	5	I, FS, WQ, CP	3	13
N2	New Pond	3	1317 Jackson Road	5	I, FS, WQ, CP	3	13
W19	Wet Pond	4	Next to 1092 S Creek Drive	5	I, FS, WQ, CP	3	13
W28	Wet Pond	5	235 Salt Rd	5	I, FS, WQ, CP	3	13
D1	Dry Pond	6	1610 Boulter Industrial Pkwy	4	I, FS, WQ, E	3	12
D4	Dry Pond	7	332 Little John Way	5	I, FS, WQ	3	12
O12	Bioretention	8	Rt 104 E at Salt Rd	5	I, WQ, SC	3	12
O13	Bioretention	9	Rt 104 W at Salt Rd	5	I, WQ, SC	3	12
O14	Bioretention	10	Rt 104 E at Monre-Wayne Rd	5	I, WQ, SC	3	12
W1	Wet Pond	11	Behind 1312 Nature Trail Circle	4	I, FS, WQ, CP	3	12
W10	Wet Pond	12	Behind 1161 Twin Leaf Terrace	4	I, FS, WQ, CP	3	12
W11	Wet Pond	13	Behind 1093 Bear Creek Circle	4	I, FS, WQ, CP	3	12
W13	Wet Pond	14	1889 Fairport Nine Mile Rd	5	I, FS, WQ	3	12
W25	Wet Pond	15	Behind 242 Gallant Fox Lane	5	I, FS, WQ	3	12
W6	Wet Pond	16	Chigwell Lane	4	I, FS, WQ, CP	3	12
W9	Wet Pond	17	Next to 1108 Bluestone Hollow	5	I, FS, WQ,	3	12
N3	New Pond	18	1270 Plank Road	3	I, FS, WQ, CP	3	11
O1	Bioretention	19	Phillips Rd	3	I, WQ, CP, SC	3	11
W17	Wet Pond	20	Behind 1838 Halesworth Lane	4	I, FS, WQ	3	11
W2	Wet Pond	21	Behind 227 Woodview Drive	3	I, FS, WQ, CP	3	11
W20	Wet Pond	22	1835 Fairport Nine Mile Point Rd	4	I, FS, WQ	3	11
W21	Wet Pond	23	2 Bainbridge Lane	3	I, FS, WQ, CP	3	11
W22	Wet Pond	24	6 Bainbridge Lane	3	I, FS, WQ, CP	3	11
W24	Wet Pond	25	1 Bainbridge Rd	3	I, FS, WQ, CP	3	11
W26	Wet Pond	26	590 Salt Rd	3	I, FS, WQ, CP	3	11
W27	Wet Pond	27	Next to 1411 Schlegel Rd	3	I, FS, WQ, CP	3	11
W3	Wet Pond	28	Across street from 222 Phillips Rd	4	I, FS, WQ	3	11

**Table 2b: Four Mile Creek Retrofit Ranking List continued**

Map I.D.	Project Type	Overall Rank	Project Location	Feasibility	Watershed Benefits	Cost Effectiveness	Score
D2	Dry Pond	29	734 Salt Rd	3	I, FS, WQ	3	10
D3	Dry Pond	30	660 Basket Rd	3	I, FS, WQ	3	10
O10	Bioretention	31	800 Phillip Rd	3	I, WQ, SC	3	10
O11	Bioretention	32	800 Phillip Rd	3	I, WQ, SC	3	10
O2	Bioretention	33	750 Phillips Rd	3	I, WQ, SC	3	10
O5	Bioretention	34	800 Phillips Rd	3	I, WQ, SC	3	10
O6	Bioretention	35	800 Phillips Rd	3	I, WQ, SC	3	10
O9	Bioretention	36	800 Phillips Rd	3	I, WQ, SC	3	10
W23	Wet Pond	37	1155 Webster Rd	2	I, FS, WQ, CP	3	10
W4	Wet Pond	38	1106 Canopy Trail	3	I, FS, WQ	3	10
W5	Wet Pond	39	1390 Silverheel Run	3	I, FS, WQ	3	10
W7	Wet Pond	40	415 Salt Rd	2	I, FS, WQ, CP	3	10
O3	Zero Order	41	1530 Salt Rd	2	I, WQ, CP, SC	3	9
O4	Zero Order	42	1733 Plank Rd	2	I, WQ, CP, SC	3	9
O7	ICR	43	800 Phillips Rd	3	I, WQ, SC	2	9
O8	ICR	44	800 Phillips Rd	3	I, WQ, SC	2	9
W14	Wet Pond	45	1563 Barrow Rd	2	I, FS, WQ, CP	3	9
W15	Wet Pond	46	1519 Barrow Hill	2	I, FS, WQ	3	9
W16	Wet Pond	47	1720 Boulder Industrial Pkwy	2	I, FS, WQ	3	9
W18	Wet Pond	48	1559 Barrow Hill Rd	2	I, FS, WQ, CP	3	9
W8	Wet Pond	49	655 Basket Rd	2	I, FS, WQ	3	9

# References:

Center for Watershed Protection. 2004a. *Unified Stream Assessment: A User's Manual*. Manual 10 in the Urban Subwatershed Restoration Manual Series. Center for Watershed Protection, Inc. Ellicott City, MD.

2004b. *Unified Subwatershed and Site Reconnaissance: A User's Manual*. Manual 11 in the Urban Subwatershed Restoration Manual Series.

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Sherwood, D.A., 2006, Water resources of Monroe County, New York, water years 2000-02: Atmospheric deposition, ground water, streamflow, trends in water quality, and chemical loads in streams

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# APPENDIX A

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## **Waterbody Inventory/Priority Waterbodies**

Table 1: Priority waterbodies list for Monroe County.

\*Note that this is only a portion of the full list.

Reference No.	Water Index Number	Name	Narrative Description	Drainage Basin	Waterbody Assessment Category	Year Updated	Primary Source of Pollutant	Problem Documentation	Notes
1	Ont 130	Sandy Creek and minor tribs	entire stream and selected/smaller tribs	Lake Ontario	Minor Impacts	2007	Agriculture	Suspected	
	NYS Barge Canal (portion 2c)	NYS Barge Canal (portion 2c)	from Holley to Rochester	Lake Ontario	Minor Impacts	2007	Hydrologic Modification	Known	
3	Ont 123-P154- 1	Northrup Creek and tribs	entire stream and tribs	Lake Ontario	Threatened	2007	Agriculture	Known	
4	Ont 120	Slater Creek and tribs	entire stream and tribs	Lake Ontario	Impaired Segments	2007	Urban/Storm Runoff	Known	
5	Ont 121	Round Pond Creek and tribs	entire stream and tribs	Lake Ontario	Minor Impacts	2007	Urban/Storm Runoff	Suspected	
6	Ont 122-P153- 2	Larkin Creek and tribs	entire stream and tribs (includes Buck Pond)	Lake Ontario	Impaired Segments	2007	Urban/Storm Runoff	Suspected	
7	Ont 124	Buttonwood Creek and tribs	entire stream and tribs	Lake Ontario	Minor Impacts	2007	Agriculture	Suspected	
8	Ont 125	Salmon Creek and minor tribs	entire stream and selected/smaller tribs	Lake Ontario	Minor Impacts	2007	Agriculture	Known	
9	Ont 125- 1 -1	West Creek, Upper, and tribs	entire stream and tribs	Lake Ontario	UnAssessed	2007			
10	Ont 125- 1	West/Moorman Creek and minor tribs	entire stream and selected/smaller tribs	Lake Ontario	Minor Impacts	2007	Agriculture	Suspected	
11	Ont 125- 2	Brockport Creek and minor tribs	entire stream and selected/smaller tribs	Lake Ontario	Minor Impacts	2007	Agriculture	Suspected	
12	Ont 125- 2- 1	Otis Creek and tribs	entire stream and tribs	Lake Ontario	UnAssessed	2007			
13	Ont 126 thru 129	Minor Tribs to Lake Ontario	total length of selected/smaller tribs	Lake Ontario	UnAssessed	2007			
14	Ont 131	Yanty Creek and tribs	entire stream and tribs	Lake Ontario	UnAssessed	2007			
15	Ont 132 thru 137 (selected)	Minor Tribs to Lake Ontario	total length of selected/smaller tribs	Lake Ontario	UnAssessed	2007			
16	Ont 134	Bald Eagle Creek and tribs	entire stream and tribs	Lake Ontario	Need Verification	2007	Agriculture	Suspected	
17	Ont 130- 1	East Branch and tribs	entire stream and tribs	Lake Ontario	Minor Impacts	2007	Agriculture	Suspected	
18	NYS Barge Canal (portion 2b)	NYS Barge Canal (portion 2b)	from Middleport to Holley	Lake Ontario	Minor Impacts	2007	Overflows	Suspected	
19	Ont 99	Fourmile Creek and tribs	entire stream and tribs	Lake Ontario	Impaired Segments	2007	Unknown Source	Suspected	
20	Ont 108/P113- 3- 8	Allen Creek and tribs	entire stream and tribs	Lake Ontario	Minor Impacts	2007	Urban/Storm Runoff	Known	
21	Ont 108/P113- 3-12	Thomas Creek/White Brook and tribs	stream and tribs, from mouth to NYS Barge Canal	Lake Ontario	Impaired Segments	2007	Other Sanitary Discharges	Known	
22	Ont 108/P113- 3	Irondequoit Creek, Lower, and minor tribs	stream and selected tribs, from mouth to NYS Barge Canal	Lake Ontario	Minor Impacts	2007	Urban/Storm Runoff	Known	
23	Ont 100	Mill Creek and tribs	entire stream and tribs	Lake Ontario	Impaired Segments	2007	Industrial	Suspected	
24	Ont 107	Shipbuilders Creek and tribs	entire stream and tribs	Lake Ontario	Impaired Segments	2007	Industrial	Suspected	
25	Ont 101 thru 106	Minor Tribs to Lake Ontario	total length of smaller tribs from Mill Creek to Irondequoit	Lake Ontario	UnAssessed	2007			

**WI/PWL Waterbody Assessment Categories**

**Impaired Segments** : These are waterbodies with well documented water quality problems that result in precluded, or impaired uses. (Waters with stressed, threatened uses are not included in this category). This category includes both High/Medium Resolvability segments, where the division considers the expenditure of additional resources to improve water quality to be worthwhile given public interest and/or the expectation that a measurable improvement can be achieved; and Low Resolvability segments, with persistent/intractable problems on which the division is not likely to spend any significant resources (e.g., atmospheric deposition, etc.).

**Segments with Minor Impacts** : These are waterbodies where less severe water quality impacts are apparent, but uses are still considered fully supported. These water correspond to waters listed as having stressed uses.

**Threatened Waterbody Segments** : These are waterbodies for which uses are not restricted and no water quality problems exist, but where specific land use or other changes in the surrounding watershed are known or strongly suspected of threatening water quality. Also included in this category are waterbodies where the support of a specific and/or distinctive use make the waterbody more susceptible to water quality threats.

**Waterbodies with Impacts Needing Verification** : These are segments that are thought to have water quality problems or impact, but for which there is not sufficient or definitive documentation. These segments require additional monitoring to determine whether uses are restricted. (Generally, this monitoring will be done during the Comprehensive Assessment Strategy rotating basin schedule).

**Waterbodies Having No Known Impacts** : These are segments where monitoring data and information indicate that there are no use restrictions or other water quality impacts/issues.

**UnAssessed Waterbodies** : These are segments where there is insufficient water quality information available to assess the support of designated uses.

**Problem Documentation**

**Known** : Water quality monitoring data and/or studies (biologic macro-invertebrate surveys, fishery studies, water column chemistry, beach closures, fish consumption advisories, shellfishing restrictions) have been completed and conclude that the use of the waterbody is restricted to the degree indicated by the listed severity.

**Suspected** : Anecdotal evidence, public perception and/or specific citizen complaints indicate that the use of the waterbody may be restricted. However, water quality data/studies that establish an impairment have not been completed or there is conflicting information.

**Possible** : Land use or other activities in the watershed are such that the use of the waterbody could be affected. However, there is currently very little, if any, documentation of an actual water quality problem.

**Waterbody Problem Description/Documentation/History/Notes**

This narrative description contains more detailed information about the waterbody segment and its water quality problem/impairment. This section may include:

- 1) a detailed description of the waterbody and surrounding area,
- 2) specific examples/instances of water use impairments, e.g., what water supply is affected? how often are beaches closed? what species of fish are restricted for consumption?
- 3) details regarding the specific pollutant and source of the impairment, and
- 4) references for specific reports, studies, monitoring data and/or other documentation that supports the impairment, pollutant and source information.

\* wastewater treatment plant - WWTP

