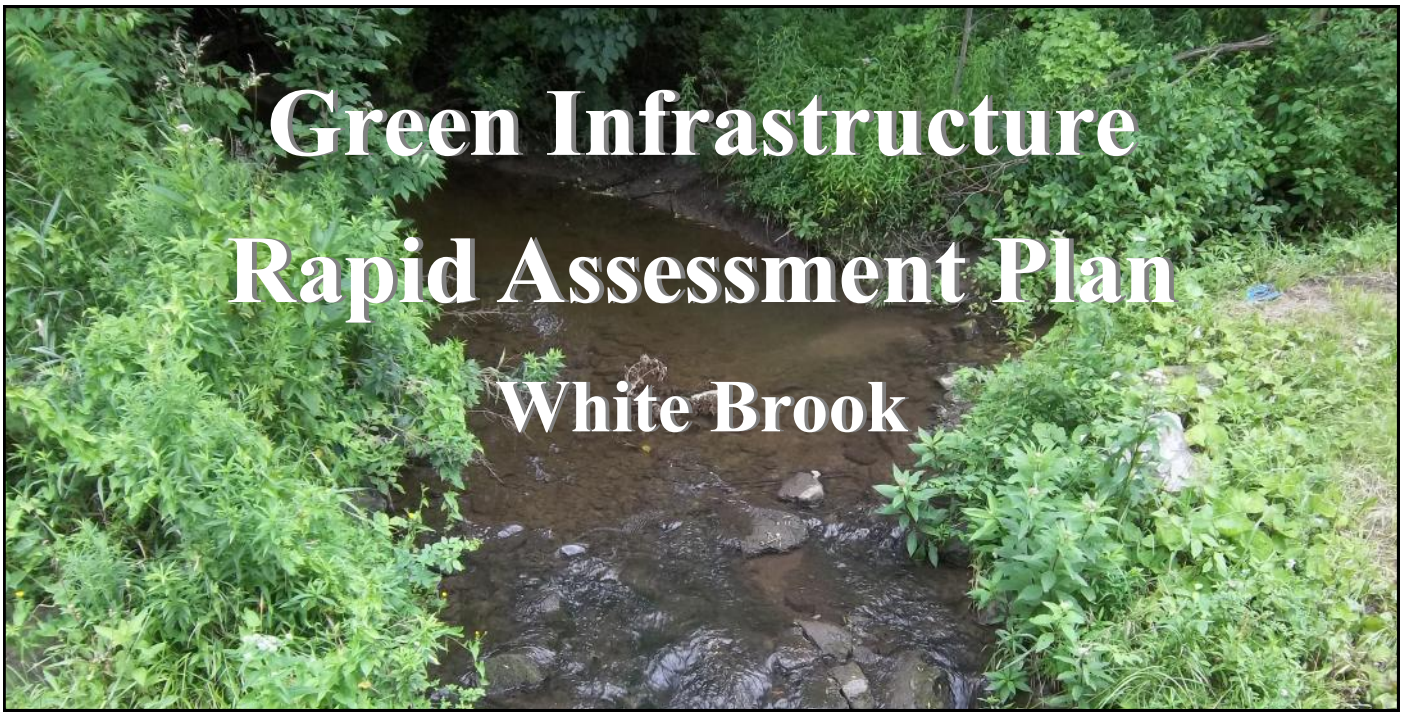


Green Infrastructure Rapid Assessment Plan

White Brook

Prepared by:

The Stormwater Coalition of Monroe County and

Monroe County

Department of Environmental Services

Prepared for:

New York State Environmental Protection Fund — Round 10

December 2013

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

Table of Contents

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

Section1. 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:

White Brook is located on the eastern side of Monroe County within the Town of Perinton (Figure 1). The headwaters of White Brook (Creek) are outside of Monroe County in Ontario County. The Creek flows north until reaching the Erie Barge Canal. At this junction it is conveyed under the Canal and flows into Thomas Creek, which then flows to the Irondequoit Creek.

Land use in the Monroe County portion of the watershed is dominated by residential, particularly in the north and west (Figure 2). Approximately 40% of this residential land pre-dates 1975 National Pollutant Discharge Elimination System (NPDES) Stormwater Program regulations (Table 1). This provides approximately 2500 acres of residential area that could benefit from stormwater retrofits. Vacant land and agricultural land make up 21% and 19% of the watershed, respectively. Agricultural activity accounts for a large portion of the land use in the southern reaches of the watershed, close to the borders with Ontario and Wayne County. These land uses constitute a majority of the watersheds approximate 6,500 acres. The small amount of commercial land within the watershed is concentrated along Pittsford-Palmyra Road, with a few outliers throughout the watershed.

Parcel data was not available to determine accurate land use in the Ontario County portion of the watershed. A basic review of aerial photos however, shows a similar land use distribution as in Monroe County with a slightly higher percentage of agricultural land. Residential land appears to be dominated by single family homes on large parcels, half an acre or bigger.

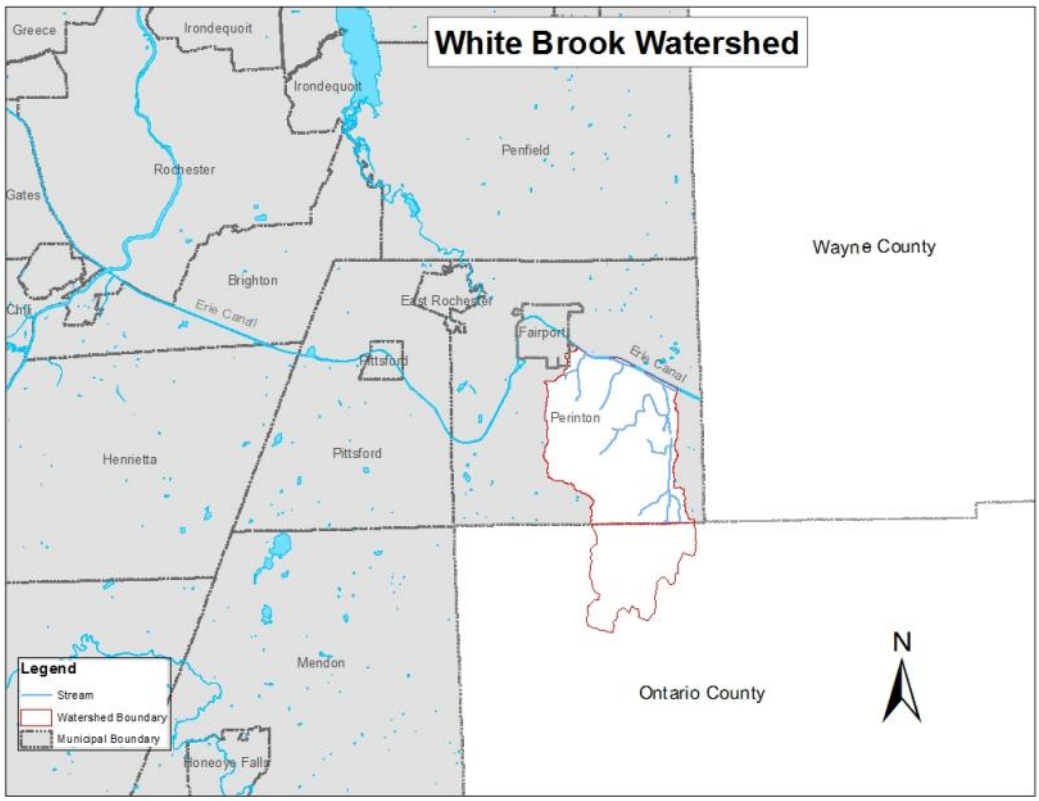


Figure 1. White Brook Watershed

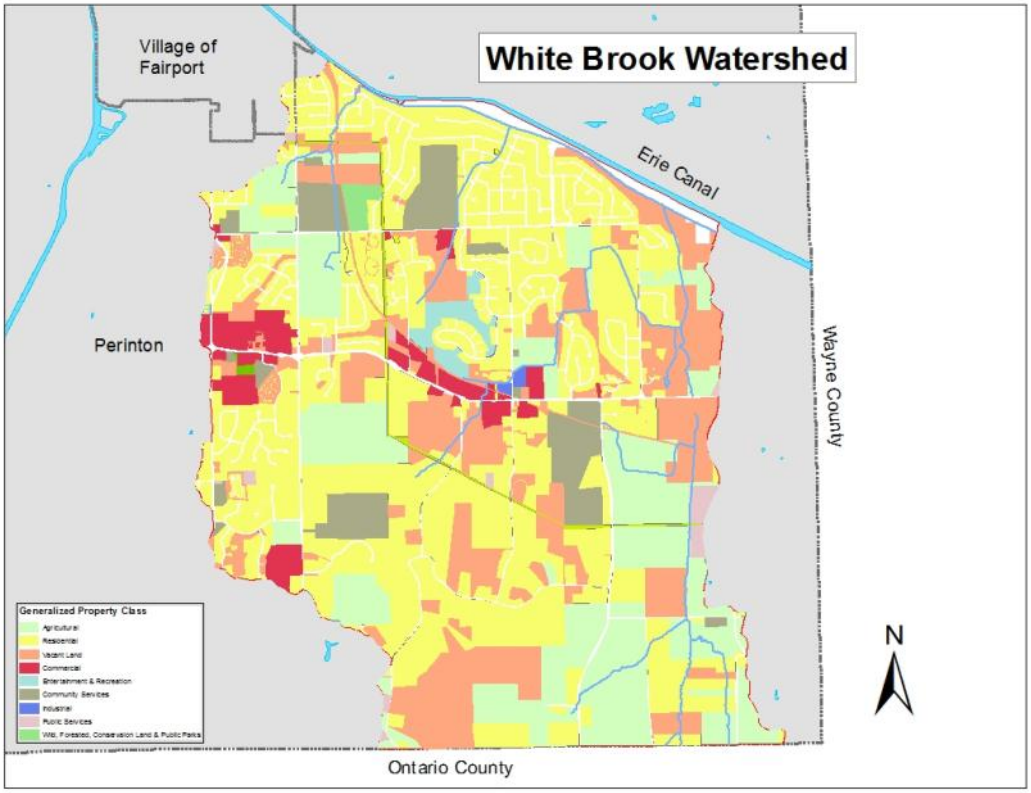


Figure 2. White Brook Land Use

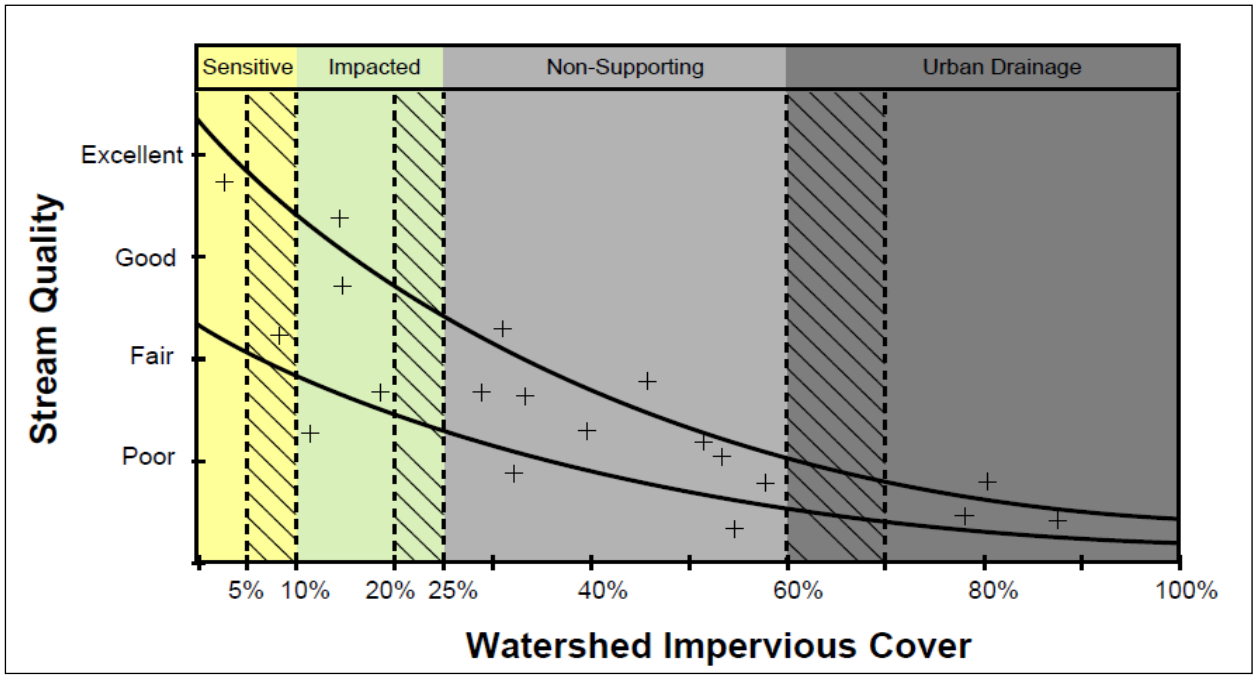
Table 1. Watershed Data for White Brook (Within Monroe County)	
Metric	**Value**
Area	6,484 acres
Mapped Stream Length	15.2 Miles
Percent of Stream Channelized	≈ 10%
Primary/secondary land use	Residential/Vacant Land/Agricultural
Land Use (percent of watershed)	
Agricultural	19
Residential	47
Vacant Land	21
Commercial	4
Recreation & Entertainment	1
Community Service	6
Industrial	<1
Public Services	1
Wild, Forested, Conservation Lands & Public	<1
# of Stormwater Treatment Ponds	≈ 18
# of Stormwater Outfalls	146
Current Impervious Cover (%)	≈ 16%
Estimated Future Impervious Cover (%)*	≈ 20.5%
Wetland acres	≈ 533
Municipal Jurisdiction	Perinton 100%

*Based on current zoning, future impervious cover (over the next 10 years) may increase by 4.5 percent.

1.4 WATERSHED CHARACTERISTICS:

1.4.1 Water Quality Concerns According to the New York State Department of Environmental Conservation's "Lake Ontario Basin Waterbody Inventory and Priority Waterbodies List" (NYSDEC 2004), Thomas Creek/White Brook is impaired for public bathing, aquatic life and recreation. Silt/sediment is a known pollutant, while nutrients and toxicity are suspected and pathogens are possible. Sources of known pollutants include; sanitary discharge, urban/stormwater runoff, and construction. Agriculture and streambank erosion are suspected pollutants. A biological (macro-invertebrate) assessment of Thomas Creek in 1999 indicated that water quality was moderately impacted, most likely by an unknown source of toxicity. Due to the amount of impervious surface area within the watershed, urban and stormwater runoff has been identified as the primary source of nutrients and other pollutants such as pathogens, oil, grease, and floatables. The full (two page) waterbody datasheet is included in Appendix A. For further information on Thomas Creek see the rapid assessment report "Green Infrastructure Rapid Assessment Plan - Thomas Creek Watershed".

USGS also developed a precipitation-runoff model of Irondequoit Creek watershed to simulate the effects of land-use changes and stormflow-detention basins on flooding and stormwater pollution. Results of model simulations indicated that peak flows and loads of sediment and total phosphorus would increase in the upper (rural) watershed, if it became developed. Discussions between Monroe County and USGS to update the model took place in late 2012 and are a recommendation of this report as well.



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. White Brook has an average of 16 % impervious cover, indicating stream quality lies somewhere between poor/fair and good, indicating that the stream is impacted.

1.4.3 Streambank Erosion As stated in Section 1.4.1 Water Quality Concerns, one of the known pollutants in the Thomas Creek watershed is silt/sediment. White Brook discharges into Thomas Creek and therefore it is possible that some portion of the silt/sediment is a result of this discharge. Specific locations are not known at this time however, it is the recommendation of this report to reach out to Towns within the White Brook watershed to ask for assistance in identifying these sort of problem areas.

1.4.4 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 White Brook watershed is: A soils 2%; B soils 68%; C soils 9%; D soils or not verified 21% (Figure 4).

The dominance of B soils in the watershed will allow for infiltration-type stormwater retrofits. These practices installed in 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 White Brook watershed.

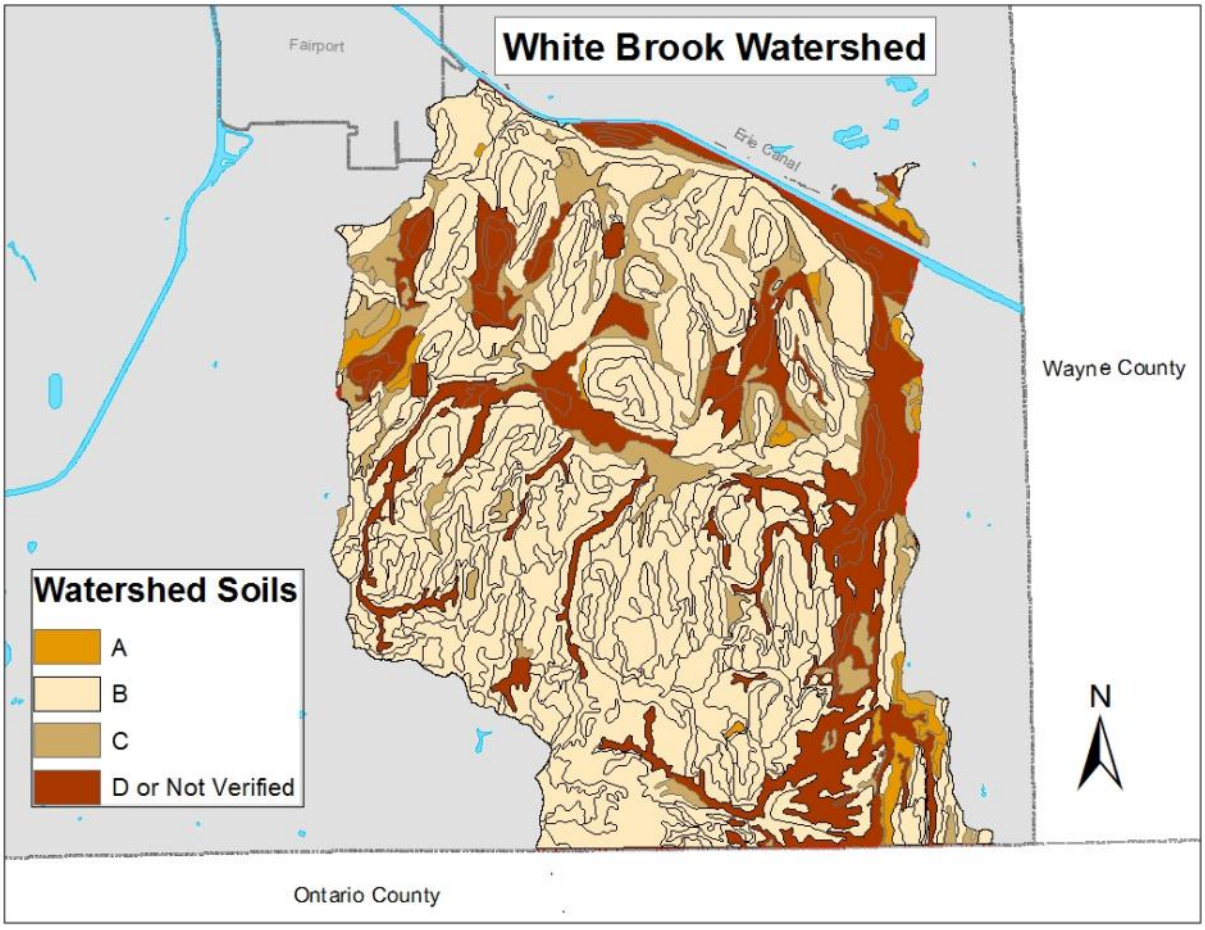


Figure 1. White Brook Watershed Soils

Section 2. Retrofit Inventory

An inventory of potential retrofit sites was generated using GIS to locate public properties, existing stormwater 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 three factors; 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 which is 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 within the watershed. Table 2a and 2b list project addresses and how they scored.

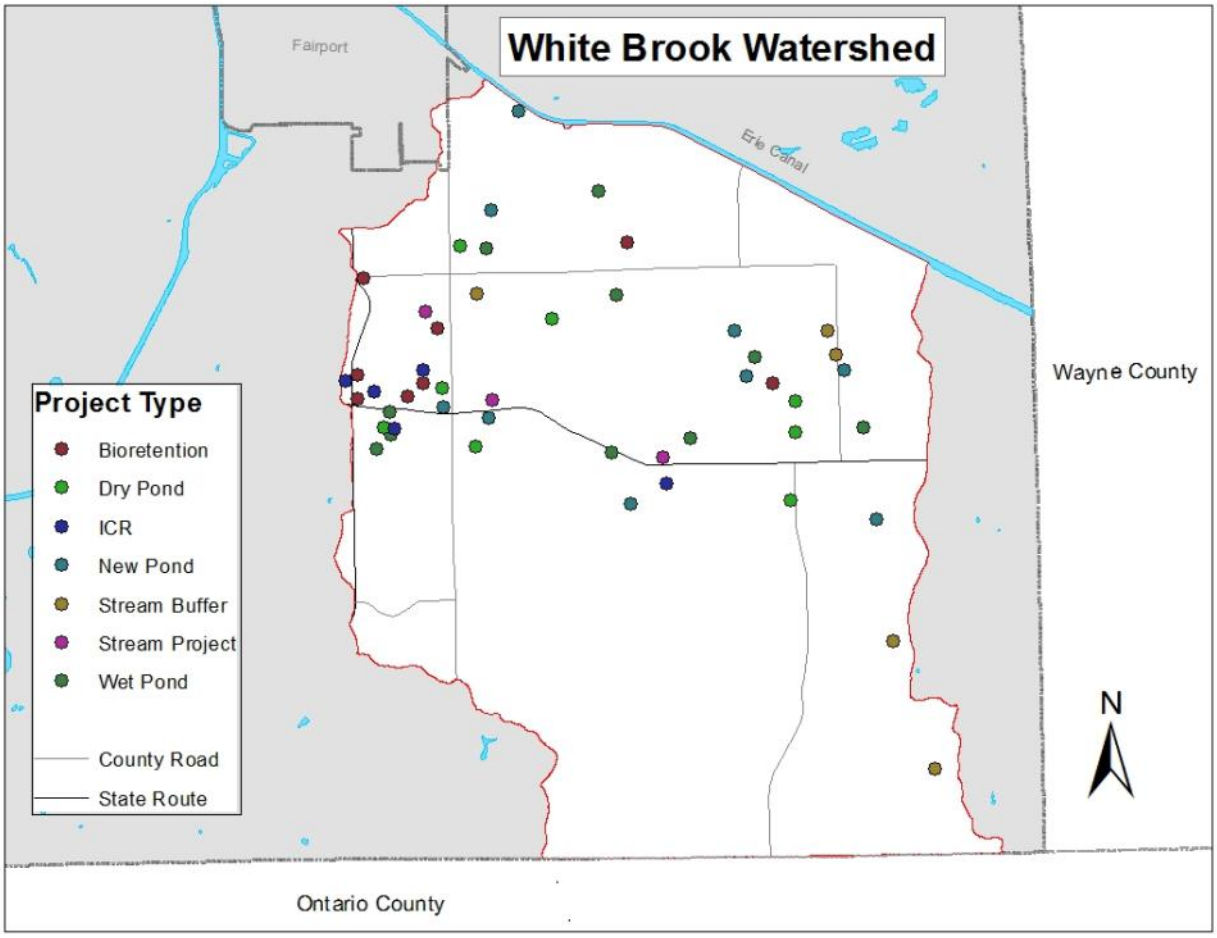

White Brook Watershed
Fairport
Erie Canal
Wayne County
Ontario County
Project Type
Bioretention
Dry Pond
ICR
New Pond
Stream Buffer
Stream Project
Wet Pond
County Road
State Route
N

Table 2a: White Brook Retrofit Ranking List

Map I.D.	Project Type	Overall Rank	Project Location	Feasability	Watershed Benefits	Cost Effectiveness	Score
D6	Dry Pond	1	1400 Turk Hill Road	5	I, FS, WQ, CP, E	3	14
W5	Wet Pond	2	1350 Turk Hill Road	5	I, FS, WQ, CP, E	3	14
O12	Bioretention	3	1358 Ayrault Road	4	I, CR, WQ, E, SC	3	13
NP1	New Pond	4	Thayer Road	5	I, FS, WQ, CP	3	13
N3	New Pond	5	Victor Road	5	I, FS, WQ, CP	3	13
NP5	New Pond	6	1749 Turk Hill Rd	5	I, FS, WQ, CP	3	13
NP6	New Pond	7	210 Aldrich Rd	5	I, FS, WQ, CP	3	13
O23	New Pond	8	Across from 1 Bardney Circle	5	I, FS, WQ, CP	3	13
NP3	New Pond	9	83 Pebble Hill Rd	5	I, FS, WQ, CP	3	13
NP4	New Pond	10	Next to 71 Broadmoor Trail	5	I, FS, WQ, CP	3	13
W3	Wet Pond	11	Next to 1 Conover Crossing	5	I, FS, WQ, CP	3	13
W4	Wet Pond	12	Off Aldrich Glen	5	I, FS, WQ, CP	3	13
W12	Wet Pond	13	Behind 76 Broadmoor Trail	5	I, FS, WQ, CP	3	13
W7	Wet Pond	14	1358 Ayrault Road	5	I, FS, WQ, E	3	13
D8	Dry Pond	15	Bardney	5	I, FS, WQ	3	12
D3	Dry Pond	16	20 Courtney Drive	5	I, FS, WQ	3	12
D5	Dry Pond	17	Next to 34 Nobleman Court	5	I, FS, WQ	3	12
D9	Dry Pond	18	Next to 12 Canton Meadow	5	I, FS, WQ	3	12
O1	ICR	19	20 Courtney Drive	4	I, CR, WQ, SC	3	12
NP7	New Pond	20	1334 Turk Hill Rd	4	I, FS, WQ, CP	3	12
W1	Wet Pond	21	20 Courtney Drive	5	I, FS, WQ	3	12
W10	Wet Pond	22	Across street from 45 Cedarview	3	I, FS, WQ, CP, E	3	12
O13	Bioretention	23	6800 Pittsford Palmyra Road	4	I, WQ, SC	3	11
O2	Bioretention	24	811 Ayrault Road	3	I, CR, WQ, SC	3	11
O6	Bioretention	25	6720 Pittsford Palmyra Road	3	I, CR, WQ, SC	3	11

Table 2b: White Brook Retrofit Ranking List

Map I.D.	Project Type	Overall Rank	Project Location	Feasability	Watershed Benefits	Cost Effectiveness	Score
O23	Bioretention	26	5 Meadow Glen	3	I, CR, WQ, SC	3	11
O14	ICR	27	6720 Pittsford Palmyra Road	3	I, CR, WQ, SC	3	11
O10	ICR	28	6894 Pittsford Palmyra Road	3	I, CR, WQ, SC	3	11
O4	ICR	29	7451 Pittsford Palmyra Road	3	I, WQ, CP, SC	3	11
O14	Biorentention	30	6720 Pittsford Palmyra Road	3	I, WQ, SC	3	10
O8	Bioretention	31	6894 Pittsford Palmyra Road	3	I, WQ, SC	3	10
O21	Bioretention	32	6720 Pittsford Palmyra Rd	3	I, WQ, SC	3	10
D1	Dry Pond	33	99 Victor Road	3	I, FS, WQ	3	10
D7	Dry Pond	34	6894 Pittsford Palmyra Road	3	I, FS, WQ,	3	10
O5	ICR	35	557-595 Moseley Road	3	I, WQ, SC	3	10
W2	Wet Pond	36	2-18 Courtney Drive	3	I, FS, WQ	3	10
W9	Wet Pond	37	7275 Pittsford Palmyra Road	3	I, FS, WQ,	3	10
O15	Bioretention	38	4 Wallingford Rise	2	I, WQ, SC	3	9
D8	Dry Pond	39	17 Royale Drive	2	I, WQ, SC	3	9
N2	Neighborhodd	40	Rolling Hill and Sandlewood Sub-Divisions	2	CR, WQ, SC	2	8
N1	Neighborhood	41	Turk Hill Estates	2	CR, WQ, SC	2	8
P2	New Pond	42	6 Pritchard Court	2	I, WQ	3	8
W11	Wet Pond	43	Hammocks Drive	3	WQ	3	7
O22	Zero-Order	44	Across street from 180 Dailey Rd	2	WQ, CP, SC	2	7

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 Manua*l. Manual 11 in the Urban Subwatershed Restoration Manual Series.

2005. *An Integrated Framework to Restore Small Urban Streams User's Manua*l. Manual 1 in the Urban Subwatershed Restoration Manual Series.

2007. *Stormwater Retrofit Practices*. Manual 3 in the Urban Subwatershed Restoration Manual Series.

New York State Department of Environmental Conservation. 2004. *Ontario Basin Waterbody Inventory and Priority Waterbodies List, Revised 2007*

USGS. Coon, W.F., 2003, Simulating Land-Use Changes and Stormwater-Detention Basins and Evaluating their Effect on Peak Streamflows and Stream-Water Quality in Irondequoit Creek Basin, New York

Sherwood, D.A., 2003, Water Resources of Monroe County, New York, Water Years 1997-99, with Emphasis on Water Quality in the Irondequoit Creek Basin--Atmospheric Deposition, Ground Water, Streamflow, Trends in Water Quality, and Chemical Loads to Irondequoit Bay

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

APPENDIX A

NYSDEC PWL Datasheet

Thomas Creek/White Brook (0302-0023) Impaired Seg

Waterbody Location Information

Revised: 05/08/2007

Water Index No: Ont 108/P113- 3-12
Drain Basin: Lake Ontario
Hydro Unit Code: 04140101/020 **Str Class:** B
Irondequoit/Ninemile
Waterbody Type: River
Reg/County: 8/Monroe Co. (28)
Waterbody Size: 28.7 Miles
Quad Map: FAIRPORT (I-11-4)
Seg Description: stream and tribs, from mouth to NYS Barge Canal

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
PUBLIC BATHING	Impaired	Known
AQUATIC LIFE	Impaired	Known
RECREATION	Impaired	Known

Type of Pollutant(s)

Known: Silt/Sediment
Suspected: NUTRIENTS, UNKNOWN TOXICITY
Possible: Pathogens

Source(s) of Pollutant(s)

Known: OTHER SANITARY DISCH, URBAN/STORM RUNOFF, Construction
Suspected: Agriculture, Streambank Erosion
Possible: - - -

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 2 (Problem Verified, Cause Unknown)
Lead Agency/Office: DOW/Reg8 **Resolution Potential:** Medium
TMDL/303d Status: 3b*

Further Details

Aquatic life support, public bathing and recreational uses in Thomas/White Creek are impaired by unspecified toxicity, nutrients and various other pollutants likely from urban/stormwater runoff and other nonpoint sources in the watershed.

NYSDEC Rotating Intensive Basin Studies (RIBS) Intensive Network monitoring of Thomas Creek in East Rochester, Monroe County, (at Baird Road) was conducted in 2000. Intensive Network sampling typically includes macroinvertebrate community analysis, water column chemistry, sediment and invertebrate tissues analysis and toxicity evaluation. During this sampling the biological (macroinvertebrate) sampling results indicated moderately impacted water quality conditions. Impact Source Determination indicated toxicity to be the primary factor affecting the fauna. Nutrient Biotic Indices also indicated nutrient levels corresponding to eutrophic conditions in the stream. Water column sampling revealed dissolved solids to be a parameter of concern, with values often slightly above the assessment criterion. Bottom sediment sampling results revealed no substances to be exceeding the Probable Effects Level - a level at which adverse impacts are expected. However several PAHs were found at levels exceeding the Threshold Effects Level - levels at which adverse impacts occasionally occur. Toxicity testing of the water column found one of three

samples showed severe reproductive impacts and indications of significant mortality as well. (DEC/DOW, BWAM/RIBS, September 2005)

A biological (macroinvertebrate) assessment of Thomas Creek in East Rochester was also conducted in 1999 during the Biological Screening effort in the basin. Sampling results also indicated moderately impacted water quality conditions and strongly suggested the presence of toxicity, the source of which was undetermined. A 1998 assessment conducted by Dr. William Sutton in cooperation with NYSDEC found slight to moderate impacts. Both assessments indicate the presence of nutrient enrichment in the stream. (DEC/DOW, BWAM/SBU, January 2001)

Urban and stormwater runoff related to the high degree of impervious surface area (shopping plazas, parking lots, roadways, etc) has been identified as the primary source of nutrients and other pollutants (pathogens, oil and grease, floatables) to the creek. Agricultural activities in the upper watershed, impacts from failing and/or inadequate on-site septic systems, tributary stream erosion and residential and commercial development throughout the watershed are also thought to contribute to nutrient and silt/sediment loadings. (Monroe County WQCC, May 2001)

Considerable bay and watershed water quality management and monitoring efforts are continuing. Municipalities within the watershed have formed the Irondequoit Watershed Collaborative. IWC activities have focused on comprehensive stormwater management efforts and (with USGS) hydrologic modeling to predict the impact of land use changes. Efforts within Monroe County include the establishment of a collaborative to assist with the implementation of phase II stormwater regulations. The Monroe County WQCC has evaluated road salt use and conducted a residential lawn care education project. A town highway facility is the focus of a pollutant removal demonstration project being conducted with NYS DEC funding. (Monroe County WQCC, May 2001)

The Monroe County Environmental Health Laboratory has maintained a cooperative monitoring program with USGS which grew out of a Nationwide Urban Runoff Program effort on Irondequoit Basin in 1980s. Subsequent USGS reports on water quality in the basin have been published in 1996, 1997 and 1999. (Monroe County Environmental Health Laboratory, May 2001)

This segment includes the portion of the stream and all tribs from the mouth to the NYS Barge Canal. The waters of the stream are Class B. Tribs to this reach/segment, including Commission Ditch (-3), are Class B and C. (May 2001)