Lower Welland River and South Niagara Falls

2012 Watershed Report Card

NIAGARA PENINSULA CONSERVATION AUTHORITY

Niagara River

Navy Island

Usshers Creek

Welland River

Grassy Brook

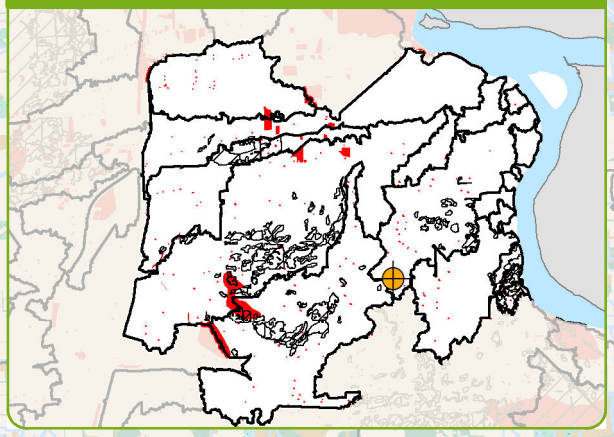
New York

Lyons Creek

Bayers Creek

Tee Creek

Groundwater



Kilometers

0 2 4 6 8

N

General Natural Areas
- Rock Barren
- Bluff
- Shoreline
- Open Water

- Successional
- Wetland
- Swamp
- Wooded Area
- Provincially Significant Wetland
- Locally Significant Wetland
- Area of Natural and Scientific Interest

- Surface Water Quality Monitoring Station
- Provincial Groundwater Monitoring Network
- Watercourses
- Significant Groundwater Recharge Area
- Highly Vulnerable Aquifer
- Subwatershed Boundary
- Sampled Subwatershed

Niagara Peninsula Conservation Authority
250 Thorold Rd., Welland, Ontario L3C 3W2
905-788-3135 info@npca.ca

Watershed Characteristics

Area	172 km^2
Land Use	Lower Welland River & South Niagara Falls watershed is within the municipalities of Fort Erie, Niagara Falls, Port Colborne, Thorold, and Welland. The watershed is a mix of urban and rural land uses. Agriculture in this area is largely corn, eggs and chickens, hay, and soybeans. There are various recreational land uses such as boating, fishing, golfing, hiking and biking trails as well as hunting by permit. Willoughby Marsh is a provincially significant wetland maintained by the Niagara Peninsula Conservation Authority. Other land uses include institutional, commercial, and industrial.
Soil Type	11% Developed Areas, 66% Mixed Clay and Loam, 0.2% Mixed Sand and Loam, 22% Mixed Silt and Loam, <0.1% Organic Soils, 1% Water
Physiography	The primary feature in the Lower Welland River & South Niagara Falls watershed is the Haldimand Clay Plain. Some of the northern portion of this watershed contains the Niagara Falls moraine.
Dams & Barriers	Perched culverts have been identified as possible fish barriers in some locations.
Sewage Services	Urban areas are serviced by municipal waste water treatment plants, while rural areas may be serviced by private septic systems.
% Natural Area Types	Total Natural Area= 90.0 km^2 23% Wooded, 6% Wetland, 36% Swamp, 35% Successional, <0.1% Unique
Woodlot or Patch Size	See table below

Size Category	Number of Woodlots	Total Woodland Area in WPA (ha)	% Woodland	Largest Woodlot (ha)
20 to 50 ha	38	1575.18	9.16	49.01
50 to 75 ha	10	785.53	4.60	68.13
75 to 100 ha	3	324.88	1.90	88.87
100 to 200 ha	6	633.1	3.70	142.76
>200 ha				

Fisheries Resources	53 species of fish are present. These include Bass, Northern Pike, and various darters, minnows, and shiners.
Species at Risk	22 species at risk exist in the Lower Welland River & South Niagara Falls watershed. Birds – 5 species including Bald Eagle and Red-headed Woodpecker. Fish – 4 species including Grass Pickerel and Lake Chubsucker. Mammals – Grey Fox. Mussels – Eastern Pondmussel. Plants – 9 species including Butternut and Eastern Flowering Dogwood. Reptiles – Blanding's Turtle and Eastern Hognose Snake.

Groundwater

Groundwater Vulnerability

The Niagara Water Strategy, NPCA Groundwater Study, and the Niagara Peninsula Source Protection Area Assessment Report have identified the Lower Welland River and South Niagara Falls watersheds as having predominantly low groundwater vulnerability due to the thick deposits of the Haldimand Clay Plain. Areas of high vulnerability are associated with limited deposits of sand and gravel and transport pathways associated with older water wells that may allow surface water and contaminants to have direct passage to aquifers.

Niagara Peninsula Conservation Authority
250 Thorold Rd., Welland, Ontario L3C 3W2
905-788-3135 info@npca.ca

Private Wells

The Lower Welland River and South Niagara Falls watersheds are primarily serviced by municipal water supplies with about 44% of the population on private water supplies such as groundwater wells. Water wells need to be properly constructed and maintained to prevent contamination. The safety, testing and treatment of a private well is the responsibility of the well owner.

Groundwater Stress

The Niagara Peninsula Source Protection Tier 1 Water Budget identified the Lower Welland River and South Niagara Falls watersheds as having low stress levels with respect to groundwater supply relative to their overall demands.

Groundwater Monitoring

The NPCA has been monitoring one Provincial Groundwater Monitoring Network (PGMN) well in the South Niagara Falls watershed since 2003. One PGMN well (W290) is located on Sauer Road in Niagara Falls and it monitors chemistry and water levels of the Salina bedrock formation. Water quality results for PGMN well W290 exceeded Ontario Drinking Water Quality Standards for boron, sodium, and selenium. All exceedances were thoroughly investigated by Ministry of Environment, NPCA, Municipal and Public Health staff and found to be caused by natural groundwater conditions. Data for this PGMN well show that groundwater levels do not have a strong seasonal cycle compared to the other NPCA PGMN well in the Salina bedrock formation, indicating this portion of the bedrock formation is slower to respond to climatic conditions.

Stewardship Highlights

The Lower Welland River Watersheds have benefited from the many activities and the active involvement of individuals, organizations and municipalities on private and public lands. Some examples of the progress which has occurred in the watershed follows:

- Watershed landowners have completed 16 water and habitat improvement projects with the assistance of the *NPCA's* Water Quality Improvement Program and other organizations such as *Land Care Niagara, Ontario Power Generation* and *Ducks Unlimited Canada*. These projects included forest, stream and wetland habitat enhancements, using over 50000 native trees, shrub and wildflowers.
- *NPCA* installed new Carolinian Natural Heritage Signs at Willoughby Marsh Conservation Areas. These signs outline the significance of these signature sites and were developed and installed in partnership with *Carolinian Canada Coalition*.
- Through *Trout Unlimited Canada's* Yellow Fish Road program, The *NPCA* coordinated an event with St. Gabriel Lalemant Catholic Elementary School which saw 17 people help paint yellow fish on 20 local stormwater drains

Niagara Peninsula Conservation Authority
250 Thorold Rd., Welland, Ontario L3C 3W2
905-788-3135 info@npca.ca

and distributed 54 door hangers to inform the community that the water (clean and dirty) that goes down these drains ends up in our local water bodies.

- Between 2007-2010, 16 schools within the Lower Welland River Watershed Area participated in the *NPCA's* ECO School schoolyard naturalization program. This program has now been replaced by the *NPCA's* current Canopies for Kids program which has seen both St. Gabriel Lalemant Catholic Elementary School and Kate S. Durdan Public School receive shade trees for their school yards.

- Since 2008, the *NPCA* and dedicated volunteers from several local naturalist clubs and community organizations have been coordinating the Niagara Envirothon, a Regional competition associated with the *Ontario Forestry Association's* Provincial Envirothon and the *Canon* Envirothon which is North America's largest high school environmental education competition. Several schools have participated from the Lower Welland River Watershed Area.

- In 1987 the Niagara River was designated as one of 43 Areas of Concern (AOCs) around the Great Lakes Basin by the governments of Canada and the United States due to degraded water quality from historical pollution. On the Canadian side, The Niagara River Remedial Action Plan (RAP) was set up in collaboration with the local community to identify water quality concerns (from the official list of 14 Beneficial Use Impairments, or BUIs) and take actions to resolve them. When the concerns have been addressed, the scientific evidence will be presented to "delist" the AOC. With the implementation of the new Great Lakes Water Quality Protocol of 2012, it is anticipated that actions to delist the AOC will be completed within the next few years. The RAP has produced several reports which can be found in Appendix A including the Niagara River Remedial Action Plan Stage 2 update report (2009); the Welland River Eutrophication Study report (2011); and the Niagara River (Ontario) AOC Update 2012.

- Extensive studies, assessments and public engagement were undertaken by the Niagara River RAP to address contamination issues in Lyons Creek East. Based on community input and scientific studies, it was decided that a monitored natural recovery process was the most suitable approach to manage the PCB-contaminated sediment. This approach would ensure that the sediments are not disturbed in order to protect the species and habitat associated with this Provincially Significant Wetland area. An Administrative Controls Protocol for Monitored Natural Recovery of Contaminated Sediments in Lyons Creek East has been developed and is being implemented through the signatory agencies (2011) for the long-term environmental protection of upper Lyons Creek East.

Niagara Peninsula Conservation Authority
250 Thorold Rd., Welland, Ontario L3C 3W2
905-788-3135 info@npca.ca

- The Niagara Restoration Council has been working to improve the local water and habitat quality as well as raise awareness of local environmental issues. In 2010 the NRC completed the Niagara River Area of Concern (AOC) Fish Barrier Project, which saw 148 fish barriers removed, unlocking over 850 km of potential fish habitat.

- Since 2007 other community groups and organizations such as *Land Care Niagara, Trees Ontario, the Welland River Keepers and Heartland Forest* have also been working to improve the local water and habitat quality as well as raise awareness of local environmental issues. These groups have commissioned various reports, coordinated public education events and taken part in environmental restoration efforts throughout the Lower Welland River Watershed area.

There has been much work completed on research and improving the health of the Lower Welland River and South Niagara Falls watersheds since 2007. **Appendix A** provides a list of published documents that describe local issues and contain recommendations and actions for further improvements.

NIAGARA PENINSULA CONSERVATION AUTHORITY

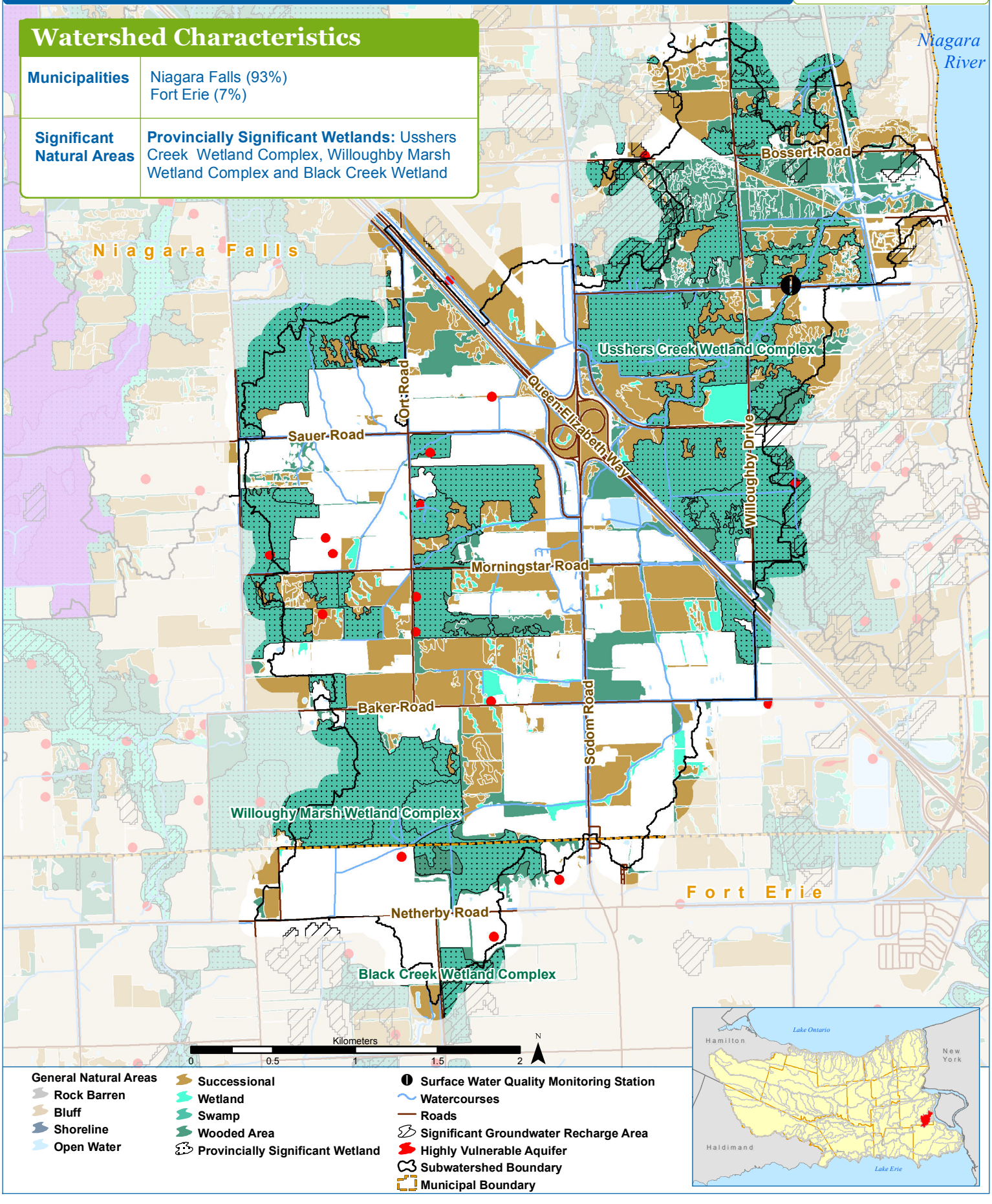
Bayers Creek

2012 Watershed Report Card

GRADES	
Surface Water Quality	D
Forest Conditions	B

Watershed Characteristics

Municipalities	Niagara Falls (93%) Fort Erie (7%)
Significant Natural Areas	**Provincially Significant Wetlands:** Usshers Creek Wetland Complex, Willoughby Marsh Wetland Complex and Black Creek Wetland



General Natural Areas
- Rock Barren
- Bluff
- Shoreline
- Open Water
- Successional
- Wetland
- Swamp
- Wooded Area
- Provincially Significant Wetland

- Surface Water Quality Monitoring Station
- Watercourses
- Roads
- Significant Groundwater Recharge Area
- Highly Vulnerable Aquifer
- Subwatershed Boundary
- Municipal Boundary

Surface Water Quality

GRADE
D

Surface water quality monitoring of Bayers Creek on Sherk Road was initiated in 2006 and was given an overall grade of D. The water quality of this watershed regularly exceeded the provincial guideline for phosphorus but met the guideline for *E. coli*. High chloride concentrations have been observed in Bayers Creek but generally concentrations have been decreasing since 2006. The benthic community found in this watershed mainly consisted of pollutant tolerant animals with some sensitive animals, but overall indicated impaired water quality. Watershed initiatives that reduce nutrient contamination will improve the water quality of Bayers Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	300	30	Phosphorus is found in products such as soap, detergent, and fertilizer as well as waste, and contributes to excess algae and low oxygen in streams and rivers
	Grade	F	B	
Bacteria	(*E. coli*/ 100ml)**	92	100	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. *E coli* is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	B	B	
Benthic	(FBI)	6.64	<5.00 (Target Only)	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.
	Grade	F	B	

*75th percentile, NPCA data. **Geometric mean, NPCA data. Province-wide Grading System used.

Forest Conditions

GRADE
B

The forest condition indicators for Bayers Creek watershed produced an overall grade of B. The Forest Cover % received a grade of A well above the provincial target due to large forested areas south of Baker Road in the headwaters and south of Sherk Road in the lower system. The Forest Interior % grade of C as even with the large forest patches, there is a lack of connectivity between them. The Riparian Zone Forested % received a grade of C as well. The vegetated areas adjacent to the watercourses in this watershed are mostly successional in nature.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	37	30	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and lowland forest types.
	Grade	A	B	
Forest Interior	%	6.3	10.0	Percent forest interior is the percentage of the watershed that is forested interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered 'edge' habitat and is prone to high predation, wind damage and alien species invasion.
	Grade	C	B	
Riparian Zone Forested	%	30.4	50.0	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions.
	Grade	C	B	

** Targets for southern Ontario based on Environment Canada (2004) and Conservation Ontario (2011)

NIAGARA PENINSULA CONSERVATION AUTHORITY

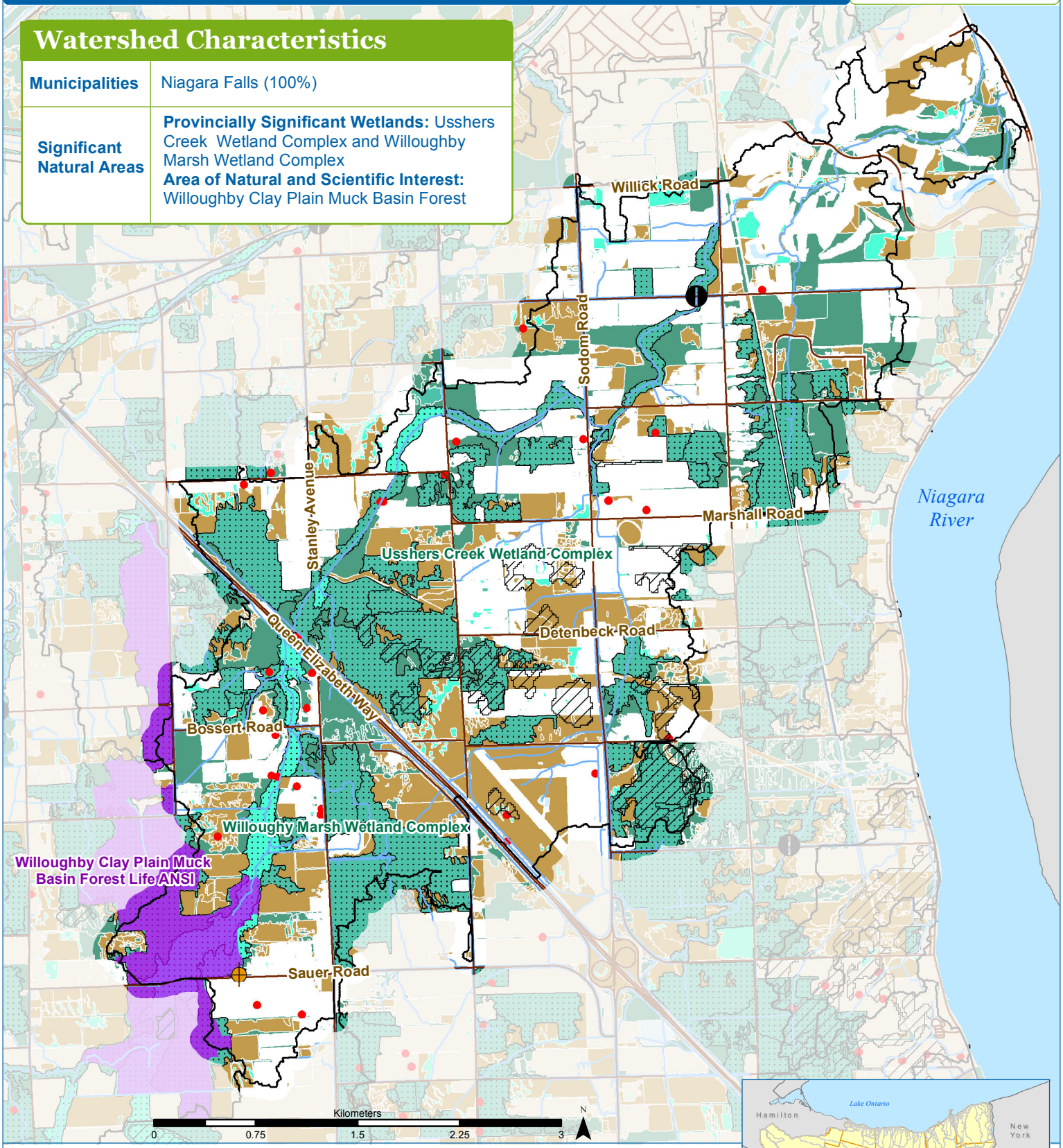
Usshers Creek

2012 Watershed Report Card

GRADES	
Surface Water Quality	D
Forest Conditions	C

Watershed Characteristics

Municipalities	Niagara Falls (100%)
Significant Natural Areas	**Provincially Significant Wetlands:** Usshers Creek Wetland Complex and Willoughby Marsh Wetland Complex **Area of Natural and Scientific Interest:** Willoughby Clay Plain Muck Basin Forest



General Natural Areas
- Rock Barren
- Bluff
- Shoreline
- Open Water
- Successional
- Wetland
- Swamp
- Wooded Area
- Provincially Significant Wetland
- Area of Natural and Scientific Interest

- Surface Water Quality Monitoring Station
- Provincial Groundwater Monitoring Network
- Watercourses
- Roads
- Significant Groundwater Recharge Area
- Highly Vulnerable Aquifer
- Subwatershed Boundary

Surface Water Quality

GRADE
D

Surface water quality monitoring of Usshers Creek on Weaver Road was initiated in 2006 and was given an overall grade of D. The water quality of this watershed regularly exceeded provincial guideline for phosphorus but met the guideline for *E. coli*. The concentrations of these parameters have remained unchanged since 2006. The benthic community found in this watershed mainly consisted of pollutant tolerant animals and indicated impaired water quality. Watershed initiatives that reduce nutrient contamination will improve the water quality of Usshers Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	300	30	Phosphorus is found in products such as soap, detergent, and fertilizer as well as waste, and contributes to excess algae and low oxygen in streams and rivers
	Grade	F	B	
Bacteria	(*E. coli*/ 100ml)**	81	100	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. *E coli* is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	B	B	
Benthic	(FBI)	8.32	<5.00 (Target Only)	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.
	Grade	F	B	

*75th percentile, NPCA data. **Geometric mean, NPCA data. Province-wide Grading System used.

Forest Conditions

GRADE
C

The forest condition indicators for Usshers Creek watershed produced an overall grade of C. The Forest Cover % received a grade of B. This grade can be attributed to the large contiguous lowland forest complex associated with the Willoughby Marsh Conservation Area. This is one of the best examples of forested wetlands known as slough forests in the Region. The Forest Interior % grade of D was well below the provincial target due to a lack of connectivity between other forests in this watershed. The Riparian Zone Forested % received a grade of C as the forests of the Marsh include large intact areas along watercourses and there is good riparian in the headwaters of this watershed.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	33	30	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and lowland forest types.
	Grade	B	B	
Forest Interior	%	4.4	10.0	Percent forest interior is the percentage of the watershed that is forested interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered 'edge' habitat and is prone to high predation, wind damage and alien species invasion.
	Grade	D	B	
Riparian Zone Forested	%	32.5	50.0	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions.
	Grade	C	B	

** Targets for southern Ontario based on Environment Canada (2004) and Conservation Ontario (2011)

NIAGARA PENINSULA CONSERVATION AUTHORITY

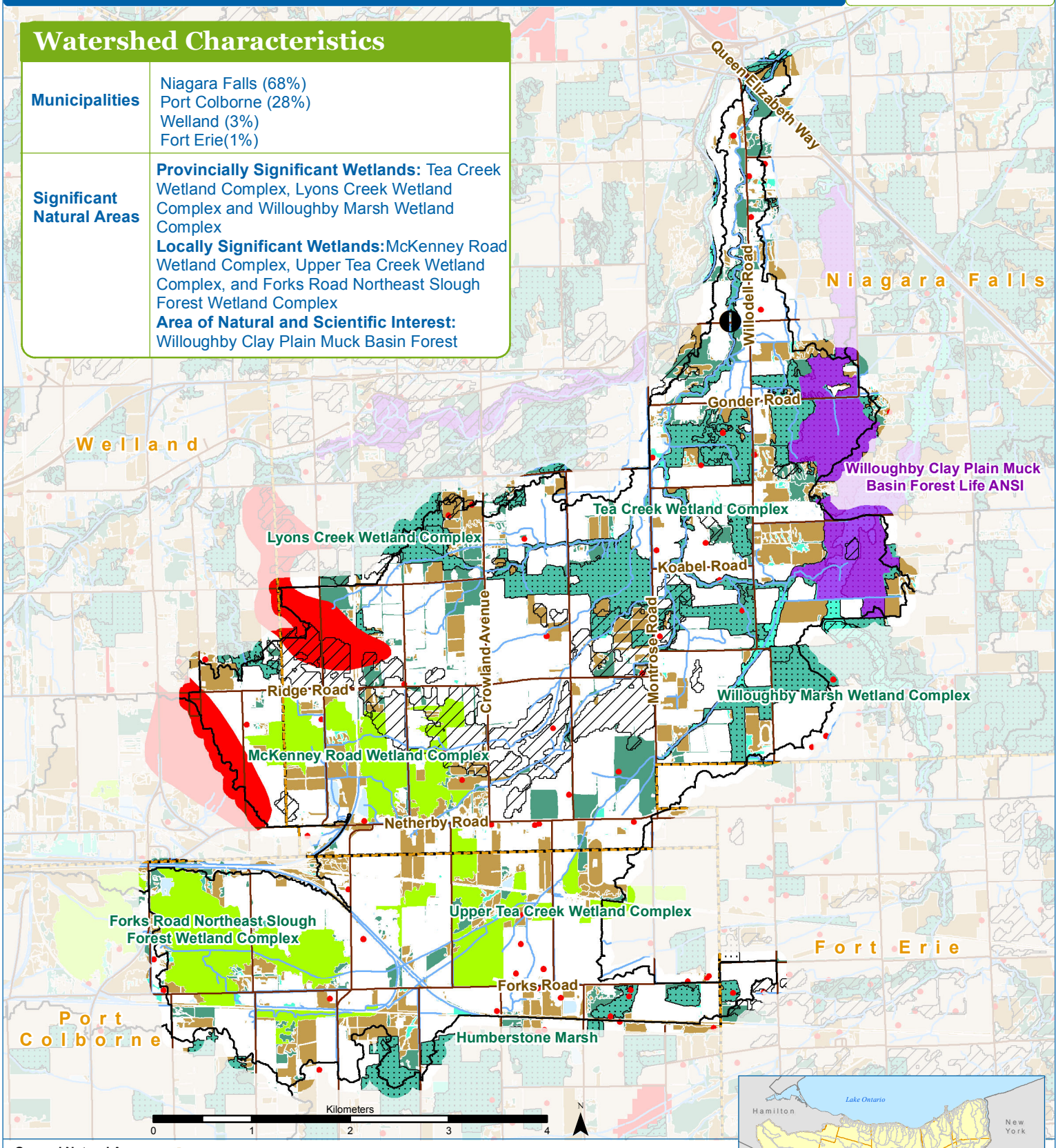
Tee Creek

2012 Watershed Report Card

GRADES	
Surface Water Quality	D
Forest Conditions	C

Watershed Characteristics

Municipalities	Niagara Falls (68%) Port Colborne (28%) Welland (3%) Fort Erie(1%)
Significant Natural Areas	**Provincially Significant Wetlands:** Tea Creek Wetland Complex, Lyons Creek Wetland Complex and Willoughby Marsh Wetland Complex **Locally Significant Wetlands:** McKenney Road Wetland Complex, Upper Tea Creek Wetland Complex, and Forks Road Northeast Slough Forest Wetland Complex **Area of Natural and Scientific Interest:** Willoughby Clay Plain Muck Basin Forest



General Natural Areas
- Rock Barren
- Bluff
- Shoreline
- Open Water
- Successional
- Wetland
- Swamp
- Wooded Area
- Provincially Significant Wetland
- Locally Significant Wetland
- Area of Natural and Scientific Interest
- Surface Water Quality Monitoring Station
- Watercourses
- Roads
- Significant Groundwater Recharge Area
- Highly Vulnerable Aquifer
- Subwatershed Boundary
- Municipal Boundary

Surface Water Quality

GRADE
D

Surface water quality monitoring of Tee Creek on Schisler Road was initiated in 2006 and was given an overall grade of D. The water quality of this watershed regularly exceeded provincial guidelines for phosphorus and *E. coli* concentrations. The concentrations of these parameters remain unchanged since 2006. The benthic community found in this watershed mainly consisted of pollutant tolerant animals and indicated impaired water quality. Watershed initiatives that reduce nutrient contamination will improve the water quality of Tee Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	270	30	Phosphorus is found in products such as soap, detergent, and fertilizer as well as waste, and contributes to excess algae and low oxygen in streams and rivers
	Grade	F	B	
Bacteria	(*E. coli*/ 100ml)**	116	100	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. *E coli* is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	C	B	
Benthic	(FBI)	6.96	<5.00 (Target Only)	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.
	Grade	F	B	

*75th percentile, NPCA data. **Geometric mean, NPCA data. Province-wide Grading System used.

Forest Conditions

GRADE
C

The forest condition indicators for Tee Creek watershed produced an overall grade of C. The Forest Cover % received a grade of B. This grade can be attributed to the large contiguous lowland forest complex associated with the Willoughby Marsh Conservation Area. This is one of the best examples of forested wetlands known as slough forests in the Region. The Forest Interior % grade of D was well below the provincial target due to a lack of connectivity between other forests in this watershed. The Riparian Zone Forested % received a grade of C as the forests of the Marsh include large intact areas along watercourses.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	30	30	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and lowland forest types.
	Grade	B	B	
Forest Interior	%	5.9	10.0	Percent forest interior is the percentage of the watershed that is forested interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered 'edge' habitat and is prone to high predation, wind damage and alien species invasion.
	Grade	D	B	
Riparian Zone Forested	%	36.7	50.0	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions.
	Grade	C	B	

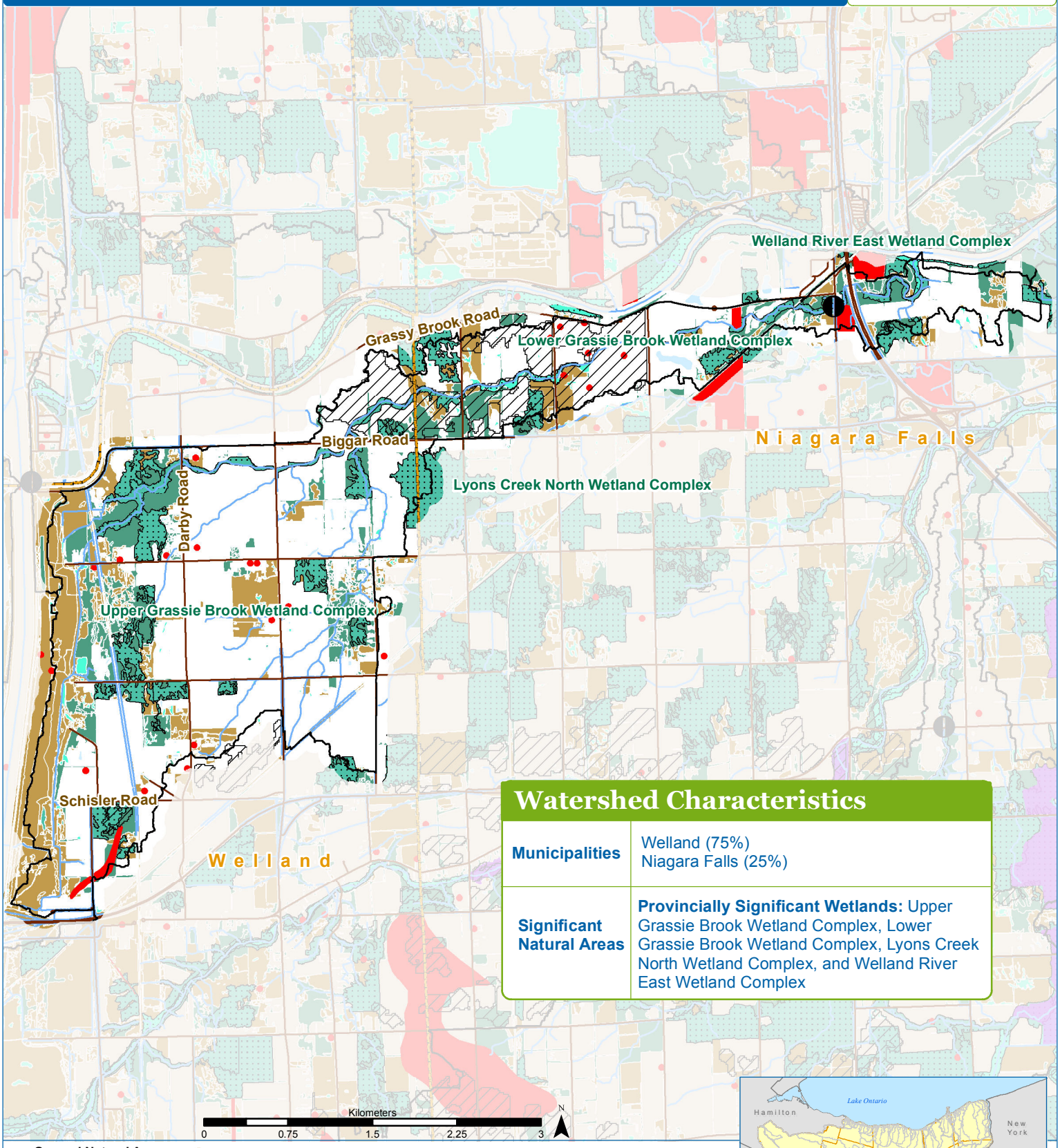
** Targets for southern Ontario based on Environment Canada (2004) and Conservation Ontario (2011)

NIAGARA PENINSULA CONSERVATION AUTHORITY

Grassy Brook

2012 Watershed Report Card

GRADES	
Surface Water Quality	D
Forest Conditions	D



Watershed Characteristics

Municipalities	Welland (75%) Niagara Falls (25%)
Significant Natural Areas	**Provincially Significant Wetlands:** Upper Grassie Brook Wetland Complex, Lower Grassie Brook Wetland Complex, Lyons Creek North Wetland Complex, and Welland River East Wetland Complex

General Natural Areas
- Rock Barren
- Bluff
- Shoreline
- Open Water
- Successional
- Wetland
- Swamp
- Wooded Area
- Provincially Significant Wetland
- Surface Water Quality Monitoring Station
- Watercourses
- Roads
- Significant Groundwater Recharge Area
- Highly Vulnerable Aquifer
- Subwatershed Boundary
- Municipal Boundary

Surface Water Quality

GRADE
D

Surface water quality monitoring of Grassy Brook on Montrose Road was initiated in 2006 and was given an overall grade of D. The water quality of this watershed regularly exceeded the provincial guideline for phosphorus but met the guideline for *E. coli*. Algal blooms occurred in the summer at this site due to high phosphorus concentrations. The benthic community found in this watershed mainly consisted of pollutant tolerant animals and indicated impaired water quality. Watershed initiatives that reduce nutrient contamination will improve the water quality of Grassy Brook.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	280	30	Phosphorus is found in products such as soap, detergent, and fertilizer as well as waste, and contributes to excess algae and low oxygen in streams and rivers
	Grade	F	B	
Bacteria	(*E. coli*/ 100ml)**	75	100	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. *E coli* is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	B	B	
Benthic	(FBI)	8.36	<5.00 (Target Only)	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.
	Grade	F	B	

*75th percentile, NPCA data. **Geometric mean, NPCA data. Province-wide Grading System used.

Forest Conditions

GRADE
D

The forest condition indicators for Grassy Brook watershed produced an overall grade of D. The Forest Cover % received a grade of C. This grade can be attributed to large forest patches just upstream and downstream of the QEW corridor. The Forest Interior % grade of F was well below the provincial target. The large forest patches lack connectivity between them resulting in the lack of interior. The Riparian Zone Forested % received a grade of D despite a concentrated voluntary stewardship program for riparian buffers in this watershed in the last decade.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	23	30	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and lowland forest types.
	Grade	C	B	
Forest Interior	%	1.9	10.0	Percent forest interior is the percentage of the watershed that is forested interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered 'edge' habitat and is prone to high predation, wind damage and alien species invasion.
	Grade	F	B	
Riparian Zone Forested	%	26.3	50.0	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions.
	Grade	D	B	

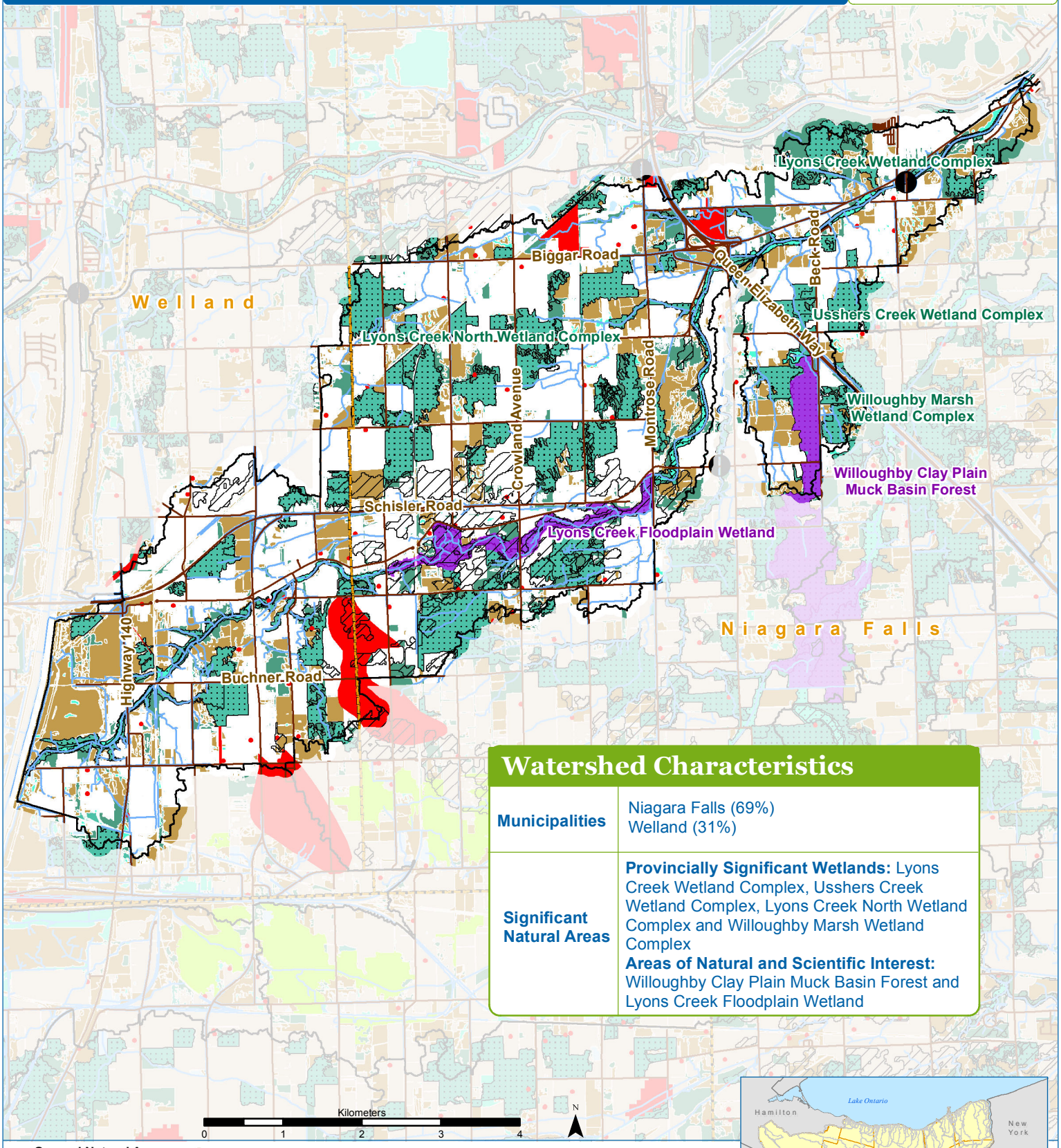
** Targets for southern Ontario based on Environment Canada (2004) and Conservation Ontario (2011)

NIAGARA PENINSULA CONSERVATION AUTHORITY

Lyons Creek

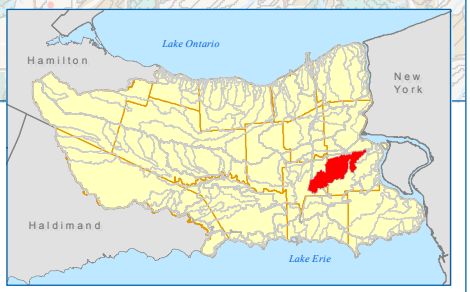
2012 Watershed Report Card

GRADES	
Surface Water Quality	D
Forest Conditions	C



Watershed Characteristics

Municipalities	Niagara Falls (69%) Welland (31%)
Significant Natural Areas	**Provincially Significant Wetlands:** Lyons Creek Wetland Complex, Usshers Creek Wetland Complex, Lyons Creek North Wetland Complex and Willoughby Marsh Wetland Complex **Areas of Natural and Scientific Interest:** Willoughby Clay Plain Muck Basin Forest and Lyons Creek Floodplain Wetland



General Natural Areas
- Rock Barren
- Bluff
- Shoreline
- Open Water
- Successional
- Wetland
- Swamp
- Wooded Area
- Provincially Significant Wetland
- Area of Natural and Scientific Interest
- Surface Water Quality Monitoring Station
- Watercourses
- Roads
- Significant Groundwater Recharge Area
- Highly Vulnerable Aquifer
- Subwatershed Boundary
- Municipal Boundary

Surface Water Quality

GRADE
D

Surface water quality monitoring of Lyons Creek on Stanley Avenue was initiated in 2003 and was given an overall grade of D. The water quality of this watershed regularly exceeded the provincial guideline for phosphorus but met the guideline for *E. coli*. The concentrations of these parameters have remained unchanged since 2003. The benthic community found in this watershed mainly consisted of pollutant tolerant animals with some exotic zebra mussels and indicated impaired water quality. Watershed initiatives that reduce nutrient contamination will improve the water quality of Lyons Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	160	30	Phosphorus is found in products such as soap, detergent, and fertilizer as well as waste, and contributes to excess algae and low oxygen in streams and rivers
	Grade	D	B	
Bacteria	(*E. coli*/ 100ml)**	31	100	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. *E coli* is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	B	B	
Benthic	(FBI)	7.86	<5.00 (Target Only)	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.
	Grade	F	B	

*75th percentile, NPCA data. **Geometric mean, NPCA data. Province-wide Grading System used.

Forest Conditions

GRADE
C

The forest condition indicators for Lyons Creek watershed produced an overall grade of C. The Forest Cover % received a grade of B. This grade can be attributed to large contiguous forests between Shisler Road and Biggar Road. These are some of the best examples of forested wetlands known as slough forests in the Region. The Forest Interior % grade of D was well below the provincial target due to a lack of connectivity between other forests in this watershed. The Riparian Zone Forested % received a grade of C due to the large forests in the headwaters of this system.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	30	30	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and lowland forest types.
	Grade	B	B	
Forest Interior	%	4.6	10.0	Percent forest interior is the percentage of the watershed that is forested interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered 'edge' habitat and is prone to high predation, wind damage and alien species invasion.
	Grade	D	B	
Riparian Zone Forested	%	29.1	50.0	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions.
	Grade	C	B	

** Targets for southern Ontario based on Environment Canada (2004) and Conservation Ontario (2011)

NIAGARA PENINSULA CONSERVATION AUTHORITY

Lower Welland River

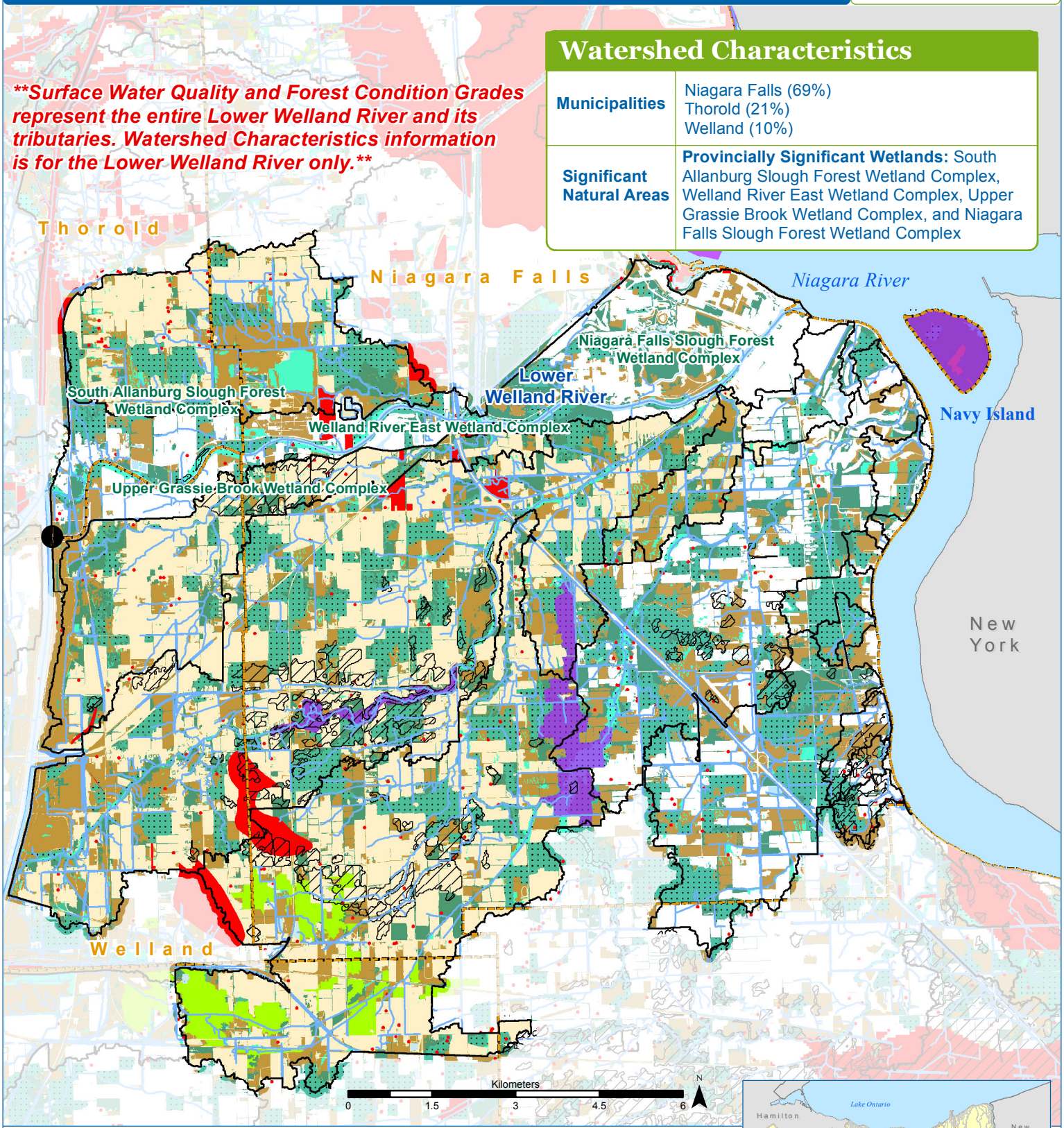
2012 Watershed Report Card

GRADES	
Surface Water Quality	D
Forest Conditions	C

Surface Water Quality and Forest Condition Grades represent the entire Lower Welland River and its tributaries. Watershed Characteristics information is for the Lower Welland River only.

Watershed Characteristics

Municipalities	Niagara Falls (69%) Thorold (21%) Welland (10%)
Significant Natural Areas	**Provincially Significant Wetlands:** South Allanburg Slough Forest Wetland Complex, Welland River East Wetland Complex, Upper Grassie Brook Wetland Complex, and Niagara Falls Slough Forest Wetland Complex



General Natural Areas
- Rock Barren
- Bluff
- Shoreline
- Open Water
- Successional
- Wetland
- Swamp
- Wooded Area
- Provincially Significant Wetland
- Locally Significant Wetland
- Area of Natural and Scientific Interest
- Surface Water Quality Monitoring Station
- Watercourses
- Provincial Groundwater Monitoring Network
- Significant Groundwater Recharge Area
- Highly Vulnerable Aquifer
- Subwatershed Boundary
- Contributing Subwatershed
- Municipal Boundary

Surface Water Quality

GRADE
D

Surface water quality monitoring of the Welland River west of the City of Welland was initiated in 2003 and was given an overall grade of C. This site represents the entire lower Welland River section and regularly exceeded the provincial guideline for phosphorus and *E. coli*. Watershed initiatives that reduce nutrient contamination will improve the water quality of the lower Welland River. The benthic community has not been sampled at this location but will be assessed in the future.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	101	30	Phosphorus is found in products such as soap, detergent, and fertilizer as well as waste, and contributes to excess algae and low oxygen in streams and rivers
	Grade	D	B	
Bacteria	(*E. coli*/ 100ml)**	113	100	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. *E coli* is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	C	B	
Benthic	(FBI)	n/a	<5.00 (Target Only)	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.
	Grade		B	

*75th percentile, NPCA data. **Geometric mean, NPCA data. Province-wide Grading System used.

Forest Conditions

GRADE
C

The forest condition indicators for Welland River East watershed produced an overall grade of C. The Forest Cover % received a grade of B. This grade can be largely attributed to the contiguous lowland forest complex associated with the Willoughby Marsh CA. This is one of the best examples of forested wetlands in the Region. The Forest Interior % grade of D was well below the provincial target due to a lack of connectivity between other forests that exist in this watershed. The Riparian Zone Forested % received a grade of C as the forests of the Marsh include large intact areas along watercourses and there is good riparian forest in other areas of the system in the headwaters and the lower reaches.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	28	30	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and lowland forest types.
	Grade	B	B	
Forest Interior	%	4.0	10.0	Percent forest interior is the percentage of the watershed that is forested interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered 'edge' habitat and is prone to high predation, wind damage and alien species invasion.
	Grade	D	B	
Riparian Zone Forested	%	28.4	50.0	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions.
	Grade	C	B	

** Targets for southern Ontario based on Environment Canada (2004) and Conservation Ontario (2011)