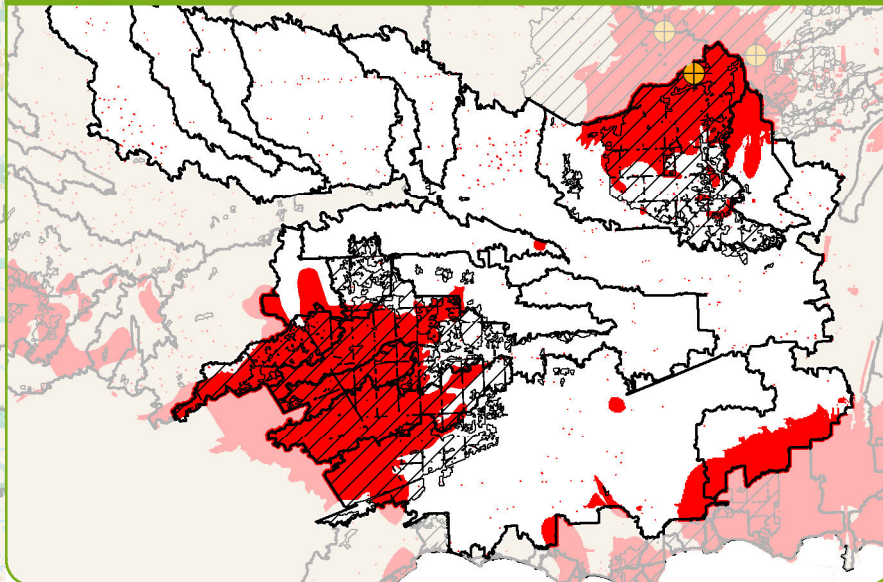


Groundwater



Beaver Creek

Coyle Creek





Drapers Creek

Welland River







Big Forks Creek









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



Watershed Characteristics



Area	464 km ²				
Land Use	Predominantly agricultural land use with a focus on egg and poultry production, grain, and oilseed. Concentrations of urban land use (residential, commercial, industrial) within the City of Port Colborne and the City of Welland. Residential pockets are also located in Fenwick, Fonthill, and Wainfleet. There are numerous conservation areas and golf courses and many biking and hiking trails throughout the watershed including a portion of the Welland Canal Trail. There are opportunities for seasonal hunting in selective conservation areas.				
Soil Type	12% Developed Areas, 34% Mixed Clay and Loam, 8% Mixed Sand and Loam, 42% Mixed Silt and Loam, 2% Organic Soils, 1% Organics, 1% Water				
Physiography	The Haldimand Clay Plain is the major feature of the watershed. There is a significant portion along the northern edge of the watershed that consists of sand plains and kame moraine known as the Fonthill Kame-Delta Complex. The south-eastern edge lies within the Onondaga Escarpment and is a part of the Wainfleet Marsh Basin. This poorly draining basin is the location of the Wainfleet Bog, the largest remaining Carolinian peatland in Canada.				
Dams & Barriers	Stream alteration may lead to fish barriers in some areas. Fish bypass channels exist to eliminate barriers in some locations.				
Sewage Services	Urban centers in Welland and Port Colborne use municipal sewage systems, while rural residents and Wainfleet residents use private septic systems. The Welland wastewater plant discharges treated water into the Welland River. There are 23 combined sewer overflows in the Central Welland River portion of the study area.				
% Natural Area Types	Total Natural Area= 149.6 km ² 22% Wooded, 7% Wetland, 47% Swamp, 24% Successional, <0.1% Unique				
Woodlot or Patch Size	Size Category	Number of Woodlots	Total Woodland Area in WPA (ha)	% Woodland	Largest Woodlot (ha)
	20 to 50 ha	77	2733.6	5.90	49.38
	50 to 75 ha	16	916.05	2.07	73.97
	75 to 100 ha	7	378.87	0.82	88.59
	100 to 200 ha	6	275.58	0.73	187.20
	>200 ha	6	1856.46	4.10	1484.75
Fisheries Resources	There are 45 fish species in the watershed. These include Northern Pike, various bullheads, bass, minnows, and shiners.				
Species at Risk	There are 30 species at risk in the Central Welland River watershed. Birds – 6 species including Least Bittern and Short-eared Owl. Fish – Bigmouth Buffalo and Grass Pickerel. Mammals – Grey Fox and Woodland Vole. Mussels – Mapleleaf mussel. Plants – 10 including American Chestnut and Swamp Rose-mallow. Reptiles – 9 including Massasauga Rattlesnake and Spotted Turtle.				

Groundwater



Groundwater Vulnerability

The Niagara Water Strategy, NPCA Groundwater Study, and the Niagara Peninsula Source Protection Area Assessment Report have identified the Central Welland River as having predominantly low groundwater vulnerability due to the thick deposits of the Haldimand Clay Plain. Areas of high vulnerability are associated with Fonthill Kame-Delta Complex and Dunnville Sand Plain sands and gravels. The groundwater system is also highly vulnerable along the Onondaga Escarpment where there is thin overburden or bedrock outcrops that allow surface water and contaminants can have direct passage to aquifers.

Private Wells

The Central Welland River Watershed Planning Area is primarily serviced by municipal water supplies with only about 14% of the population on private water supplies such as groundwater wells. However Big Forks Creek is 100% privately serviced. 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 Central Welland River Watershed as at low stress levels with respect to groundwater supply relative to their overall demands.

Stewardship Highlights



The Central Welland River Watershed has 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 47 water and habitat improvement projects with the assistance of the *NPCA's Water Quality Improvement Program*, the *Ontario Soil and Crop Improvement Association*, *Niagara Community Foundation*, *Wetland Habitat Fund*, *Great Lakes Sustainability Fund*, *Land Care Niagara*, *Ontario Power Generation* and *Ducks Unlimited Canada*. These projects included Best Management Farm Practices, wetland enhancement, riparian buffer establishment and upland forest restoration projects, using over 76000 native trees, shrubs and wildflowers.
- The *NPCA* held a Restoration Workshop focused on improving different landscapes using plants native to Niagara. The workshop held at EC Brown Conservation Area was attended by agencies, community groups, and the general public.
- Between 2007-2010, 13 schools within the Central 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 5 elementary schools each receive shade trees for their school yards.
- Through *Trout Unlimited Canada's* Yellow Fish Road program, The *NPCA* coordinated 2 events in the Central Welland River Watershed Area. 26 people from local community groups helped paint yellow fish on 44 stormwater drains and distributed 230 door hangers to inform the public that the water (clean and dirty) that goes down these drains ends up in our local water bodies.



- The *NPCA* has been engaged to monitor Gypsy Moth populations at several conservation areas in the Central Welland River Watershed Area. The results indicate the Gypsy Moth population is negligible. The moth populations have been on the decline over the last 3 years.
- The *NPCA* acquired E.C. Brown wetland in 2005 with a vision of reestablishing a natural wetland. After much design, construction, and replanting this conservation area was opened to the public 2008. This conservation area is a popular site and has fulfilled the vision established by the *NPCA* in 2005. In 2010 this project received a National Merit Award from the Canadian Society of Landscape Architects for Excellence in Landscape Architecture.
- The *NPCA's* Angler Catch & Release Program was developed in 2003 in partnership with the *Ministry of Natural Resources*, the *Ministry of the Environment*, and *Environment Canada*. Since the program began, each fall the *NPCA* has captured, measured and tagged fish over 150mm at varying locations along the Welland River. Between 2007 and 2011, the *NPCA* tagged 225 fish of which 11 have been recaptured and reported by the public. Since the inception of the program 14 tagged fish have successfully travelled through the siphons at Merritt Island in Welland.
- The *NPCA's* Welland River Angler Diary Program which began in 2001 distributed 171 diaries to local anglers between 2007 and 2011. This program was started to monitor the success of the Welland River Walleye Stocking Program in partnership with *Ministry of Natural Resources*, *Fort Erie Conservation Club* and *Port Colborne and District Conservation Club*. In 2009 the *NPCA* noticed an increase in the capture rate of walleye based on the results of the Angler Diaries.



- The *Port Colborne District Conservation Club* has been actively working in the Watersheds since 1954 to promote the respect and wise management of our natural resources. Since 2007 they have coordinated many public education events from fishing derbies to community clean ups and been involved in various restoration efforts including tree planting and walleye spawning bed creation and enhancement. Of particular note is the release of nearly 28,000 walleye, hatched and raised back into the Welland River Watershed helping the recovery of our declining native walleye population.



- 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. According to the RAP’s Stage 2 Report, remedial measures have resulted in the

following BUI's have been re-designated to "Not Impaired": Restrictions on Wildlife Consumption, Fish Tumours and Other Deformities, and Bird or Animal Deformities or Reproduction Problems. 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 the appendix 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.

- The *Niagara Restoration Council (NRC)* 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, Fort Erie Conservation Club*, and the *Welland River Keepers* 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 Central Welland River Watershed area.



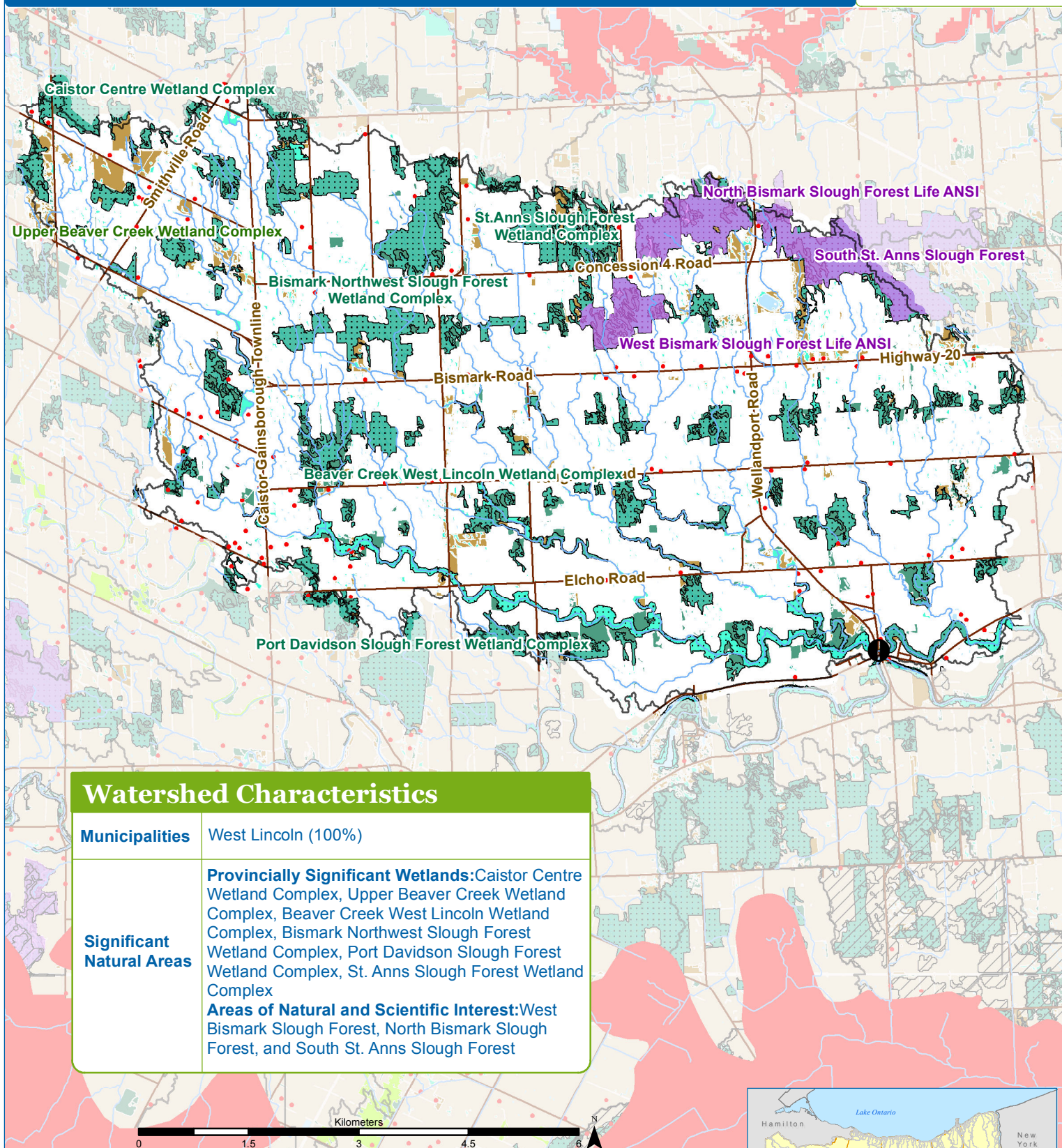
There has been much work completed on research and improving the health of the Central Welland River Watershed Area since 2007. **Appendix A** provides a list of some of the documents that have been published which have aided in a better understanding of the local issues as well as put forth recommendations and actions for further enhancements and improvements to the watersheds.

Beaver Creek

2012 Watershed Report Card

GRADES

Surface Water Quality	D
Forest Conditions	D



Watershed Characteristics

Municipalities	West Lincoln (100%)
Significant Natural Areas	<p>Provincially Significant Wetlands: Caistor Centre Wetland Complex, Upper Beaver Creek Wetland Complex, Beaver Creek West Lincoln Wetland Complex, Bismark Northwest Slough Forest Wetland Complex, Port Davidson Slough Forest Wetland Complex, St. Ann's Slough Forest Wetland Complex</p> <p>Areas of Natural and Scientific Interest: West Bismark Slough Forest, North Bismark Slough Forest, and South St. Ann's Slough Forest</p>

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
- Highly Vulnerable Aquifer
- Subwatershed Boundary



GRADE

D

Surface Water Quality

Surface water quality monitoring of Beaver Creek on Canborough Road 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. This watershed was prone to duckweed blooms in the summer likely due to very high nutrients and low flow conditions. The benthic community found in this watershed mainly consisted of pollutant tolerant animals and indicated impaired water quality. Watershed initiatives that reduce nutrient and bacteria contamination will improve the water quality of Beaver Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	510	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	(<i>E. coli</i> /100ml)**	98	100	<i>E. coli</i> is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. <i>E. coli</i> is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	B	B	
Benthic	(FBI)	7.95	<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.

GRADE

D

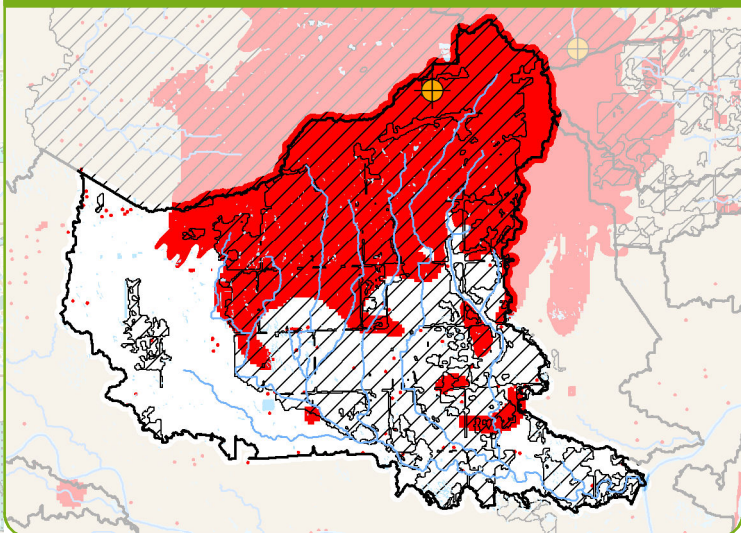
Forest Conditions

The forest condition indicators for Beaver Creek watershed produced an overall grade of D. The Forest Cover % received a grade of C due to a small number of relatively large forested patches in the headwaters of this system just west of Caistor Gainsborough Townline road. The Forest Interior % grade of D was well below the provincial standard. This grade can be attributed to the lack of connectivity between the existing forested patches. The Riparian Zone Forested % received a grade of D as well. The vegetated areas adjacent to the watercourses in this watershed are successional in nature.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	19	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	%	2.9	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	%	22.8	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	

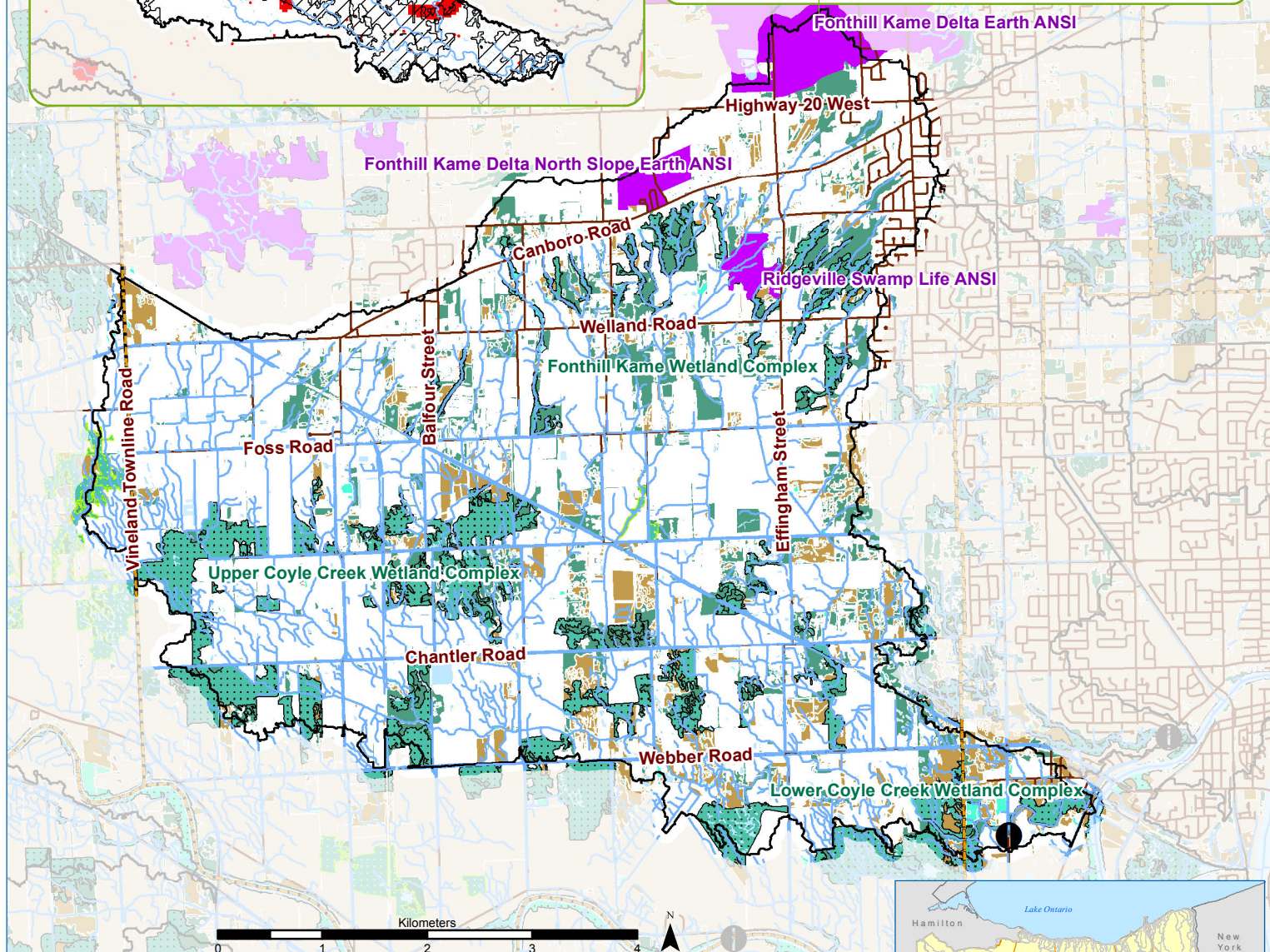
** Targets for southern Ontario based on Environment Canada (2004) and Conservation Ontario (2011)

Groundwater



Watershed Characteristics

Municipalities	Pelham (96%) Welland (3%) West Lincoln (1%)
Significant Natural Areas	<p>Provincially Significant Wetlands: Fonthill Kame Wetland Complex, Upper Coyle Creek Wetland Complex, and Lower Coyle Creek Wetland Complex</p> <p>Locally Significant Wetlands: Poth Road Wetland Complex and Wiley Road Wetland Complex</p> <p>Areas of Natural and Scientific Interest: Fonthill Kame Delta, Fonthill Kame Delta North Slope, and Ridgeville Swamp</p>



- | | | |
|---|---|---|
| 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
Roads
Significant Groundwater Recharge Area
Highly Vulnerable Aquifer
Subwatershed Boundary |
|---|---|---|



Surface Water Quality

GRADE

D

Surface water quality monitoring of Coyle Creek on South Pelham Road was initiated in 2003 and was given an overall grade of D. The water quality of this watershed regularly exceeded provincial guidelines for phosphorus and 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 and indicated impaired water quality. The benthic community also had a high proportion of exotic zebra mussels present. Watershed initiatives that reduce nutrient and bacteria contamination will improve the water quality of Coyle Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	170	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	(<i>E. coli</i> /100ml)**	130	100	<i>E. coli</i> is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. <i>E. coli</i> is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	C	B	
Benthic	(FBI)	6.52	<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 Coyle Creek watershed produced an overall grade of D. The Forest Cover % received a grade of C due to several mid-sized forested patches in the headwaters and central parts of this system. These exist mostly in the west as the eastern portion is along the urban boundary of the Town of Pelham. The Forest Interior % grade of F at just over 1% was well below the provincial standard. This grade can be attributed to the small size of the forested patches that remain and their lack of connectivity. The Riparian Zone Forested % received a grade of C as many of the forests that remain are along watercourses in this system particularly in the headwaters.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	24	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	%	1.4	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	F	B	
Riparian Zone Forested	%	27.0	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)

Drapers Creek

2012 Watershed Report Card

GRADES

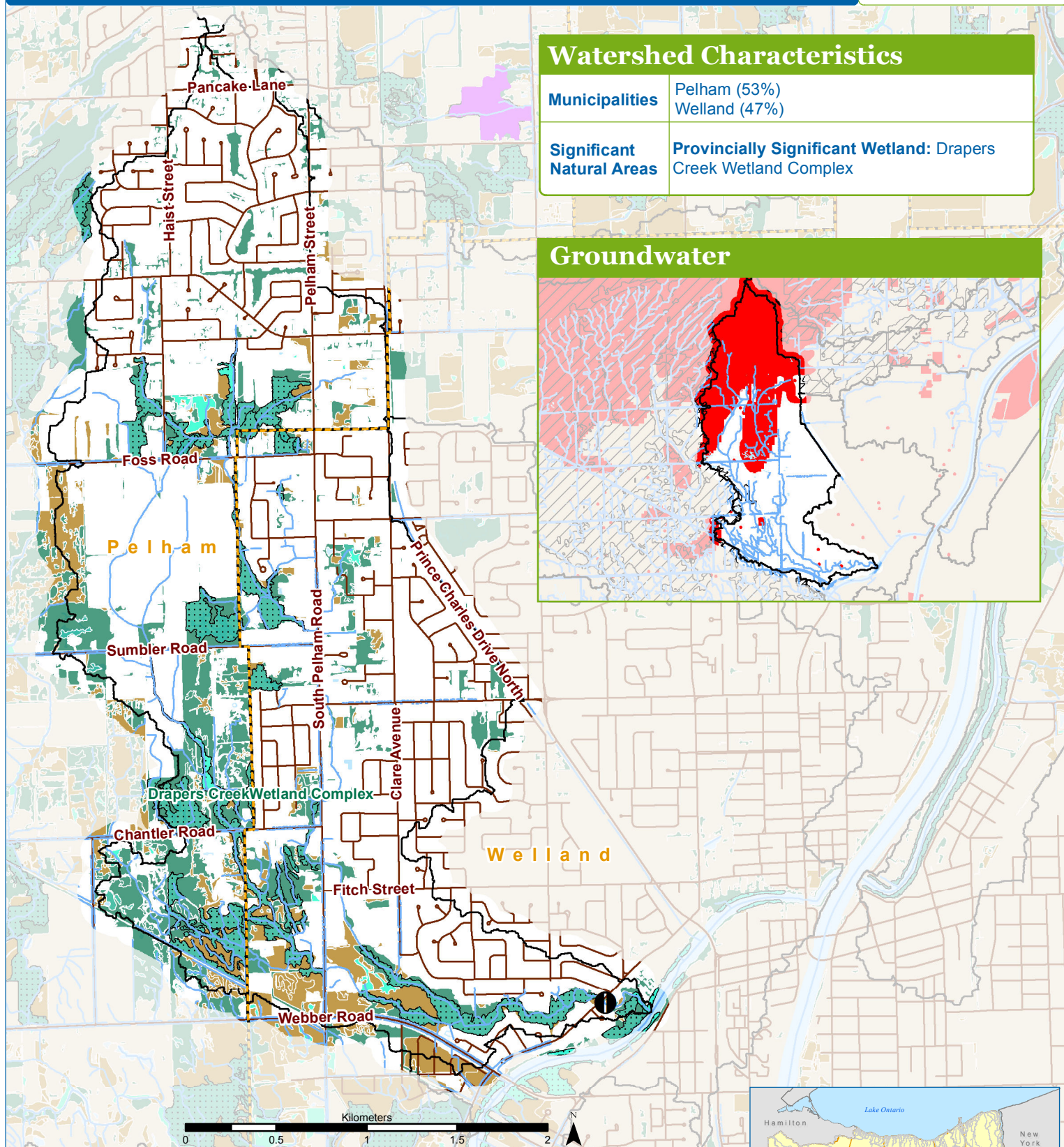
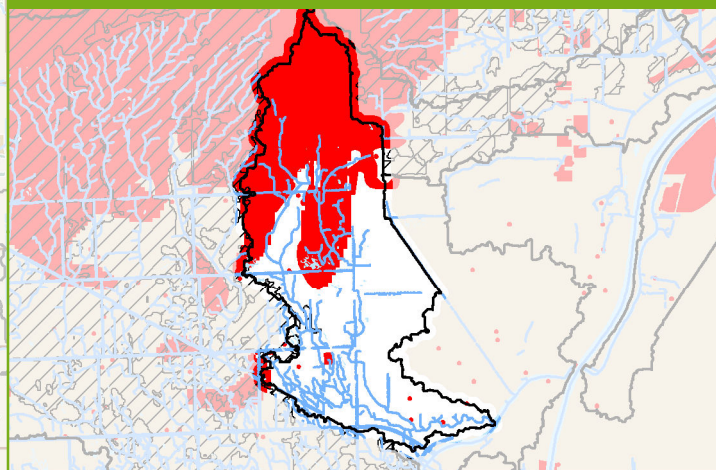
Surface
Water Quality **D**

Forest
Conditions **D**

Watershed Characteristics

Municipalities	Pelham (53%) Welland (47%)
Significant Natural Areas	Provincially Significant Wetland: Drapers Creek Wetland Complex

Groundwater



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



Surface Water Quality

GRADE

D

Surface water quality monitoring of Drapers Creek on Colbeck Road was initiated in 2003 and was given an overall grade of D. The water quality of this watershed regularly exceeded provincial guidelines for phosphorus and for *E. coli*. The concentrations of these parameters have remained unchanged since 2003. There were also occasional exceedances of copper observed. The benthic community found in this watershed mainly consisted of pollutant tolerant animals and indicated impaired water quality. Watershed initiatives that reduce nutrient and bacteria contamination will improve the water quality of Drapers Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	150	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	(<i>E. coli</i> /100ml)**	286	100	<i>E. coli</i> is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. <i>E. coli</i> is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	C	B	
Benthic	(FBI)	7.17	<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 Drapers Creek watershed produced an overall grade of D. The Forest Cover % received a grade of C due to mid-sized forested patches in the headwaters of this system to the west. The central and lower portions of this watershed are urban and the forests that remain are associated with large housing developments. The Forest Interior % grade of F at less than 1%, is well below the provincial standard. This grade can be attributed to the small size of the forested patches that remain and their lack of connectivity. The Riparian Zone Forested % received a grade of C as many of the forests that do remain are along watercourses in the western portion of the headwaters.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	21	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	%	0.1	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	%	38.6	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)

Big Forks Creek

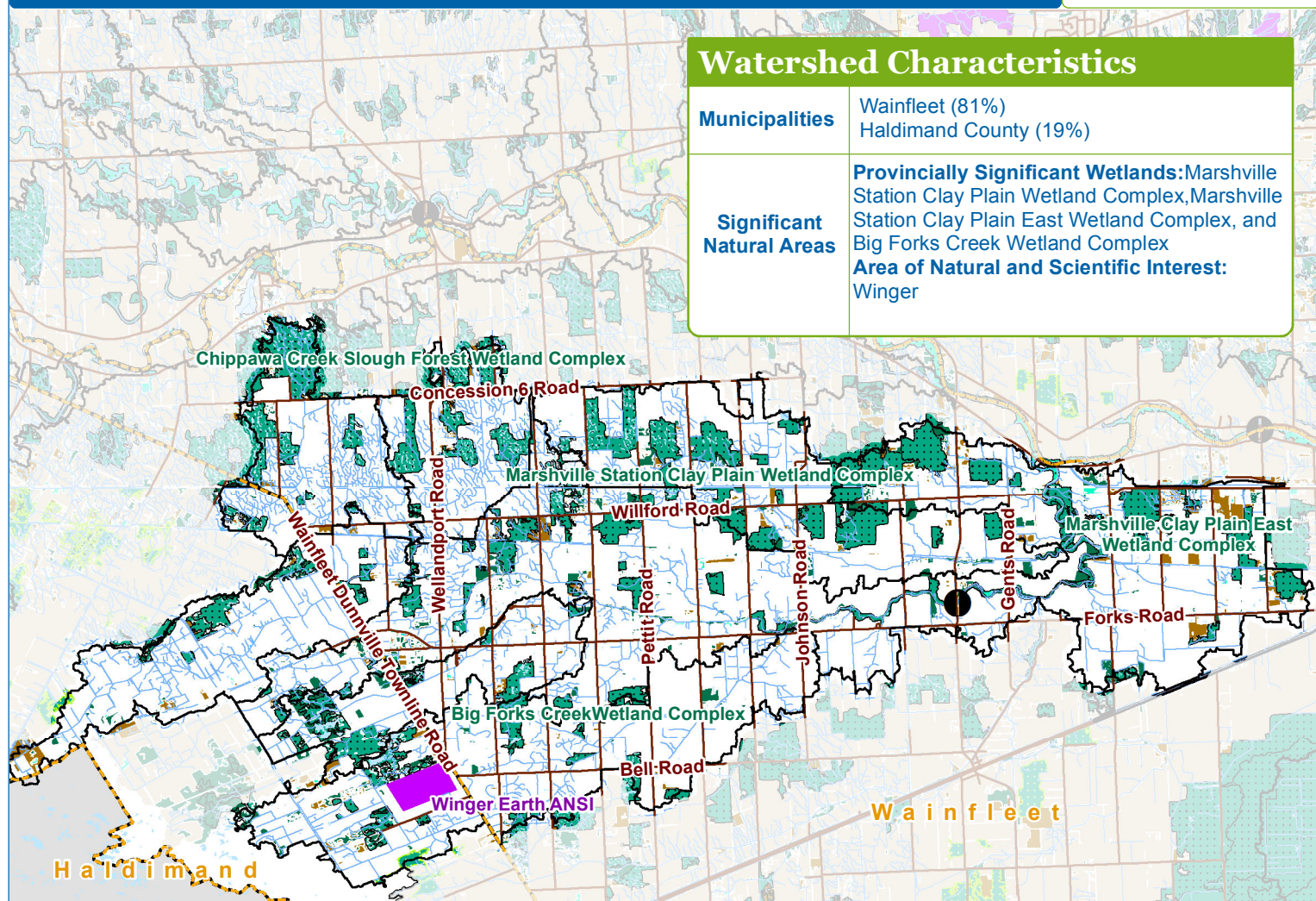
2012 Watershed Report Card

GRADES

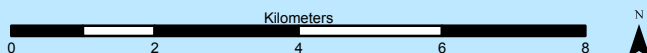
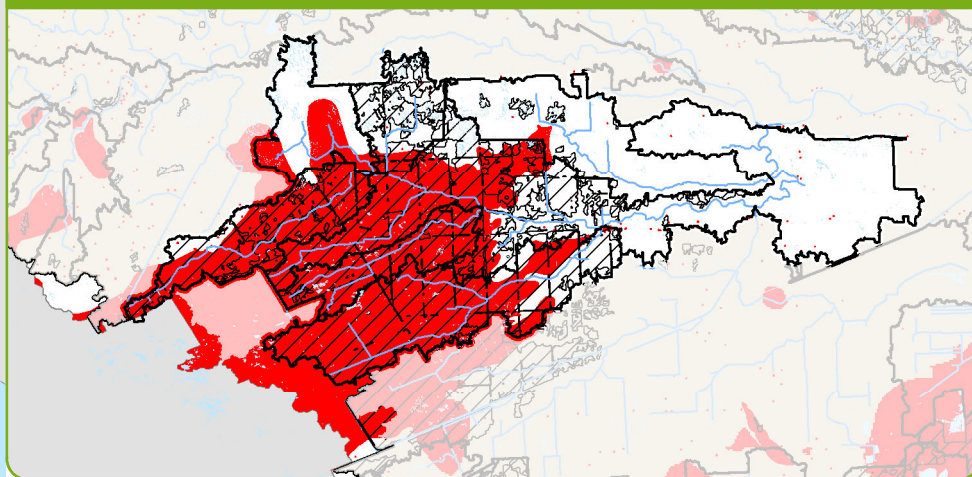
Surface Water Quality	D
Forest Conditions	D

Watershed Characteristics

Municipalities	Wainfleet (81%) Haldimand County (19%)
Significant Natural Areas	Provincially Significant Wetlands: Marshville Station Clay Plain Wetland Complex, Marshville Station Clay Plain East Wetland Complex, and Big Forks Creek Wetland Complex Area of Natural and Scientific Interest: Winger



Groundwater



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



Surface Water Quality

GRADE

D

Surface water quality monitoring of Big Forks Creek on Gents Road was initiated in 2003 and was given an overall grade of D. The water quality of this watershed regularly exceeded provincial guidelines for phosphorus and for *E. coli*. The concentrations of these parameters have remained unchanged since 2003. This watershed is also prone to duckweed blooms in the summer likely due to very high nutrients and low flow conditions. The benthic community found in this watershed mainly consisted of pollutant tolerant animals and indicated impaired water quality. Watershed initiatives that reduce nutrient and bacteria contamination will improve the water quality of Big Forks Creek.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	540	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	(<i>E. coli</i> /100ml)**	100	100	<i>E. coli</i> is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. <i>E. coli</i> is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	B	B	
Benthic	(FBI)	8.22	<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 Big Forks Creek watershed produced an overall grade of D. The Forest Cover % received a grade of C which is due in part to several large forested patches along Wilford Road. The Forest Interior % grade of F was well below the provincial standard. This grade can be attributed to the lack of connectivity between the existing forested patches. The Riparian Zone Forested % received a grade of D. Where vegetation does exist adjacent to the watercourses in this watershed, it is mostly successional.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	19	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	%	2.1	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	%	18.0	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)

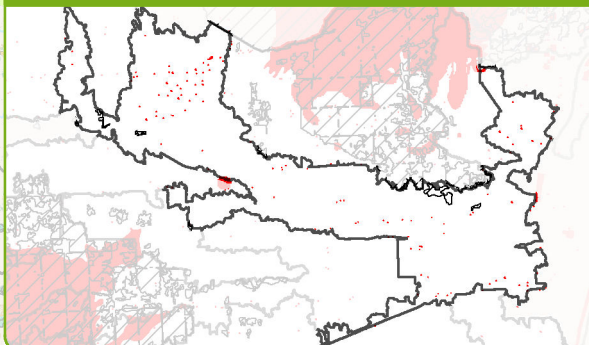
Welland River: Welland West

2012 Watershed Report Card

GRADES

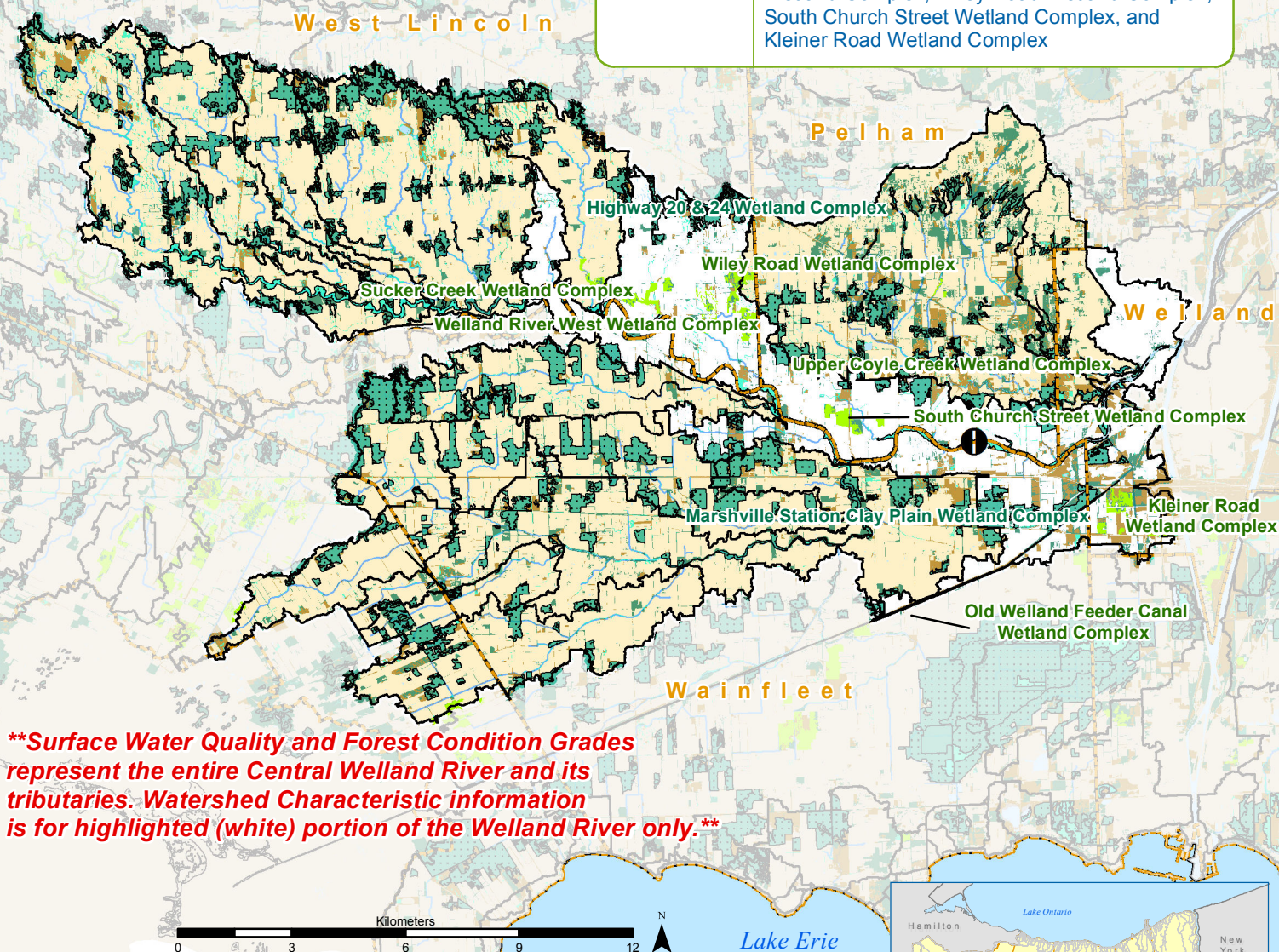
Surface Water Quality	D *
Forest Conditions	D *

Groundwater



Watershed Characteristics

Municipalities	West Lincoln (29%) Wainfleet (29%) Welland (22%) Pelham (20%)
Significant Natural Areas	Provincially Significant Wetlands: Highway 20 and 24 Wetland Complex, Little Forks Wetland Complex, Welland River West Wetland Complex, Upper Coyle Creek Wetland Complex, Lower Coyle Creek Wetland Complex, Old Welland Feeder Canal Wetland Complex and Marshville Station Clay Plain Wetland Complex Locally Significant Wetlands: Sucker Creek Wetland Complex, Wiley Road Wetland Complex, South Church Street Wetland Complex, and Kleiner Road Wetland Complex



****Surface Water Quality and Forest Condition Grades represent the entire Central Welland River and its tributaries. Watershed Characteristic information is for highlighted (white) portion of the Welland River only.****

General Natural Areas

- Rock Barren
- Bluff
- Shoreline
- Open Water

Successional

- Wetland
- Swamp

Wooded Area

- Provincially Significant Wetland
- Locally Significant Wetland

Surface Water Quality Monitoring Station

- Watercourses
- 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 D. This site represents the entire central Welland River watershed and regularly exceeded the provincial guideline for phosphorus but met the guideline for *E. coli*. This watershed was prone to duckweed blooms in the summer likely due to very high nutrients concentrations and low flow conditions. 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 the Welland River.

Indicators		2007 - 2011	Provincial Guideline	Indicator Description
Phosphorus	(µg/L)*	285	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	(<i>E. coli</i> /100ml)**	46	100	<i>E. coli</i> is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste and, in water, indicates fecal contamination. <i>E. coli</i> is a strong indicator for the potential to have other disease-causing organisms in the water.
	Grade	B	B	
Benthic	(FBI)	8.15	<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 Welland River_West Welland watershed produced an overall grade of D. The Forest Cover % received a grade of C due to the small number of forested patches that remain mostly in the headwaters of this system. The lower portion of this watershed is urban and the forests that remain are associated with large housing developments. The Forest Interior % grade of D is well below the provincial standard. This grade can be attributed to the small size of the forested patches that remain and their lack of connectivity. The Riparian Zone Forested % received a grade of D as vegetation along watercourses is largely successional in nature.

Indicators		2007 - 2011	S. Ont. Target**	Indicator Description
Forest Cover	%	22	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	%	5.0	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	%	19.5	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	D	B	

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