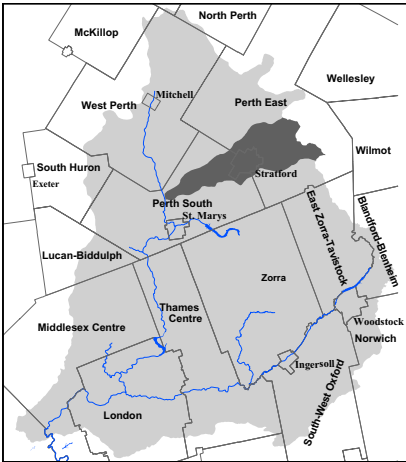


Avon River Watershed Report Card

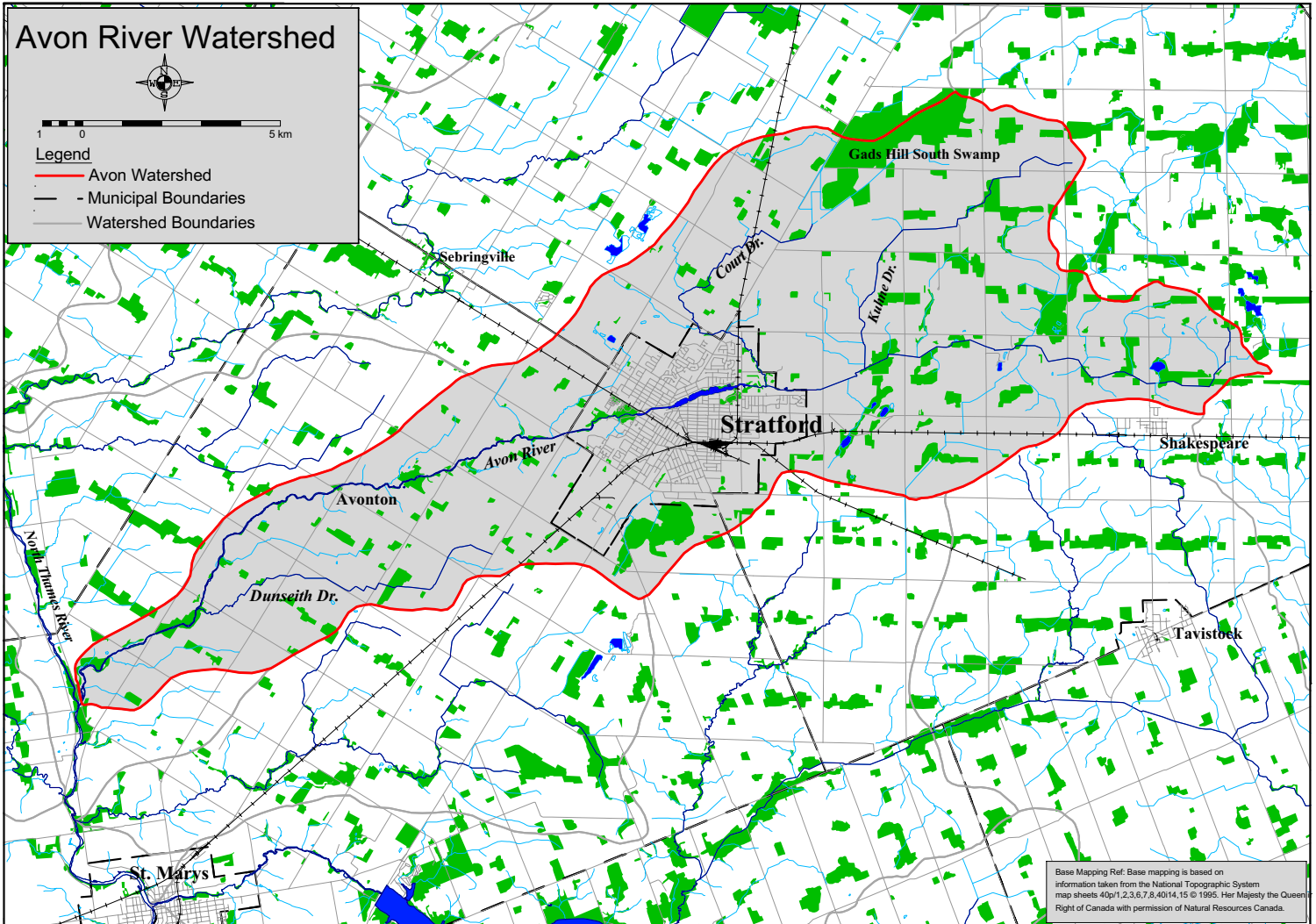


This report card outlines environmental information for the Avon River watershed. This watershed is graded against 27 other subwatersheds within the Upper Thames River watershed. The information provides a description of forest and water parameters and ideas for local action to assist agency staff, municipalities and interested parties working for the protection of local forest and water resources. These report cards are part of a larger report titled *The Upper Thames River Watershed Report Cards* (UTRCA, 2001) that is posted on the Upper Thames River Conservation Authority (UTRCA) web site. (See back)

Grades:

D Forest Conditions

D Surface Water Quality



Municipalities: Perth East (93 sq. km), Perth South (55 sq. km), Stratford (21 sq. km)
Watercourses: Avon River (tributary of North Thames River), Court Drain, Dunseith Drain, Kukhe Drain



Grade

D

Forest Conditions

Overall, forest conditions in the Avon River watershed score a D grade and the grades for the three indicators range from B to D- (see table below). The amount of forest cover (11%) is average for the Upper Thames watershed, but still considered too low for sustainability. The ideal for southern Ontario is 25-30% natural cover (Carolinian Canada, 2000). Forest density is very low indicating the woodlots are isolated

from each other making it difficult for seeds to be transported and wildlife to move between them. The amount of forest interior is relatively good suggesting that several very large woodlots are providing habitat for sensitive species that need to live in large, protected forests. Many of the larger woodlots are located in the northeast end of the watershed.

Indicators	Avon River Results		Upper Thames Watershed Average		Indicator Description
	Value	Grade	Value	Grade	
Forest Cover	11%	D	12%	D	Forest cover is the percentage of the watershed that is forested. It is believed there should be 25-30% natural cover in southern Ontario's landscape to sustain our native plants and animals.
Forest Density	41%	D-	55%	D	Forest density is a measure of how close woodlots are to each other. Woodlots that are near several other woodlots tend to have greater species diversity than those that are isolated. The movement of seeds and animals between woodlots ensures a healthy gene pool.
Forest Interior	2.4%	B	1.8%	D	Forest interior refers to the protected core area found inside a woodlot that some bird species require to nest and breed successfully. The outer 100m perimeter of a woodlot is considered 'edge' habitat and prone to high predation, alien species invasion, sun and wind damage, etc.

Local Actions Needed for Improvement:

- Protection of all woodlands and Locally Significant Wetlands at the municipal planning level is a very important and effective method of preserving local forest cover. This goal can be achieved through designations in Official Plans, enforcement of tree cutting by-laws, restrictive zoning and other appropriate planning measures.
- Connections can be made between woodlots and other habitats by planting hedgerows and windbreaks along fields, watercourses and roads.
- Forest interior can be increased by “bulking up” woodlots to make them larger and rounder by planting native trees and shrubs around existing woodlots or allowing the edges to naturalize on their own (e.g. retire land near woodlot edges).
- To increase natural plant cover in Stratford, target the naturalization of school yards, public parks and open spaces, river valleys, residential and industrial/commercial properties.
- Forest cover along the Avon River is sparse except for the downstream end near the confluence with the North Thames River. This area could become an excellent wildlife corridor with additional tree planting and naturalization efforts.
- To improve the health of individual woodlots, woodlot owners should prepare and follow Woodlot Management Plans.
- Gads Hill South Swamp is the largest wooded area in the Avon River watershed and thus it holds the greatest potential for wildlife. Much of it is publically owned. Biological inventory work should be targeted here as well as wildlife enhancement projects and the planting of corridors to connect it to nearby woodlands.



The Avon River joins the North Thames River north of St. Marys

Grade
D

Surface Water Quality

Water quality in the Avon River watershed ranks a D with the four indicators ranging from C to D- (see table below). Conditions are poor upstream of Stratford with a further deterioration in water quality immediately downstream of the city. Water quality improves further downstream of Stratford where more natural stream conditions help to

improve the water. Fecal coliform bacteria levels are high in the Avon River indicating on-going contamination from human and animal waste. Phosphorus levels are poor but have improved significantly since the 1970's. There have been 45 spills reported in the Avon River watershed since 1988 which is high in comparison to other watersheds in the area.

Indicators	Avon River Results		Upper Thames Watershed Average		Provincial Guideline	Indicator Description
Benthic Score (FBI)	5.23	C	5.66	C	---	Benthic organisms are the aquatic invertebrates that live in stream sediments and are a good indicator of water quality and stream health. The 'Family Biotic Index' (FBI) scores each species according to its pollution tolerance.
Phosphorus (mg/l)	0.12*	D -	0.08*	D	0.03 (Provincial Objective)	Phosphorus is found in such products as soaps, detergents, fertilizers and pesticides, and contributes to excess algae and low oxygen in streams and lakes.
Bacteria (per 100 ml)	711*	D	304*	C	100 (Recreational Swimming Guideline)	Fecal coliform bacteria are found in human and animal waste and their presence in water indicates fecal contamination. Fecal coliform bacteria are a strong indicator for the potential to have other disease-causing organisms in the water.
Conductivity (μs/cm)	900*	D-	642*	D	---	Conductivity is a measure of water's ability to conduct an electrical current and is an indicator of the level of dissolved solids and pollutants in water.

*10 year average concentration, 1990-2000 (Ministry of the Environment data)

Local Actions Needed for Improvement:

- Implement recommendations from the *Stratford-Avon River Environmental Management Project* (SAREMP, 1984).
- Implement recommendations from the *Court Drain Subwatershed Study*, especially with respect to urban stormwater management.
- Plant buffers (grassed or treed) along all open drains, creeks and rivers to filter runoff, and provide shade to streams. Enhancing vegetative cover is a priority in this watershed. Target rehabilitation of the three coldwater streams.
- Conduct further study on fish habitat and stream characteristics.
- Encourage environmentally sustainable practices on golf courses (e.g. Audubon Cooperative Sanctuary Program).
- Address the high number of spills and other urban/industrial pollution inputs through education, regulation, and improved response.
- Within the City of Stratford the following actions should be targeted:
 - upgrade sewer systems where risk of contamination is greatest (e.g. combined sanitary/storm sewers), extend sanitary sewers to urban properties on septic systems, and repair or replace faulty existing septic systems;
 - implement stormwater management plans for new urban developments and implement projects to reduce stormwater runoff (e.g. infiltration ponds, pavement alternatives, etc);
 - encourage river clean-up /stream stewardship projects to improve stream habitat; and
 - educate urban residents regarding urban Best Management Practices such as reduction and proper use of pesticides and fertilizers, and proper household hazardous waste disposal.
- The following actions should be targeted in rural areas:
 - encourage landowners to repair or replace faulty septic systems;
 - encourage agricultural Best Management Practices in the areas of manure storage and spreading, soil conservation practices, fertilizer and pesticide storage and application, fuel storage, milkhouse washwater disposal, and cattle access restriction; and
 - promote the completion of Environmental Farm Plans and Nutrient Management Plans.

Groundwater Quality

The Groundwater Management Study for the City of Stratford (PUC, 2000) identified known and potential sources of groundwater contamination including: automobile fuelling stations, manufacturing/industry, municipal/provincial sites, landfills, snow dumps, and septic systems. Most impacts are from fuels and metals. Impacts from deep non-aqueous phase liquids such as coal tar and solvents are a concern.

- Recommendations from *The Groundwater Management Study for the City of Stratford* (PUC, 2000) should be implemented (e.g. properly decommissioning contaminated

sites, restricting spreading of sewage sludge and developing a public involvement/education program to address groundwater protection.)

- Implement protection of identified infiltration zones, and continue with groundwater research and monitoring (refer to *Perth County Groundwater Study, 2000*)
- Encourage the decommissioning of abandoned wells according to Ministry of the Environment standards.

Avon River Watershed Features

Area	169 sq. km (5% of Upper Thames River watershed)
Land Use	76% agriculture, 14% urban, 11% wooded (GIS derived using OMAFRA Landuse Systems, 1983)
Soil Type	78% silty loam soil, 10% clay loam, 7% bottomland, 4% organic, 1% sandy loam, 1% not mapped (urban) (GIS derived using county soil maps)
Soil Erosion/Delivery	6% of the watershed is classified as highly erodible, meaning lands that contribute over 7 tonnes/ha of soil to a watercourse per year. The average for the Upper Thames River watershed is 9%. (GIS derived using 1991 Geomatics data)
Physiography	75% undrumlinized till plain, 12% spillway, 6% kame moraine, 4% til moraine, 3% peat muck, 1% water. (Chapman and Putnam, 1984)
Stream Flow	2.0 cubic metres/sec is the mean annual flow 8 km downstream of Stratford. The Avon River contributes 5% of the flow to the Thames downstream of London. (Environment Canada)
Groundwater	There is a fairly large shallow overburden aquifer (< 18m) southwest of Stratford and along the Avon River. The rest of the watershed taps into the deeper bedrock aquifers. (MOE 1981)
Fishery Resources	34 species of fish have been recorded in the Avon watershed including Smallmouth and Largemouth Bass. Three coldwater streams have been identified in this watershed.
Dams	Four dams are present on watercourses in this watershed including Thomas Orr Dam, Shakespeare Conservation Area Dam, and John Street Weir (UTRCA, 1991).
Sewage Treatment	The Stratford Wastewater Pollution Control Plant discharges treated effluent to the Avon River. Rural residences in the watershed are serviced by private septic systems.
Woodlot Size	54% of the woodlots are very small (<4 ha), 19% are small (4-10 ha), 14% are mid-sized (10-30 ha), 3% are large (30-40 ha) and 10% are very large (>40 ha). (GIS derived using 1997 NTS maps)
Riparian Forest	19% of the Riparian Zone (20 metres on either side of all watercourses) is forested. The average for the Upper Thames watershed is 24%. (GIS derived using 1997 NTS maps)
Rare Species	Fish – Greenside Darter (UTRCA and DFO 2000)
Significant Natural Sites	Provincially Significant Wetlands – Little Lakes & Swamp Forest Complex, Gads Hill South Wetland Locally Significant Wetlands – Shakespeare Hills & Avon Banks, Stratford Wetland Complex Significant Natural Areas – Avonbank Woods (MNR and UTRCA 1996)

References: For a complete listing of references, see the full report: *The Upper Thames River Watershed Report Cards* (UTRCA, 2001).