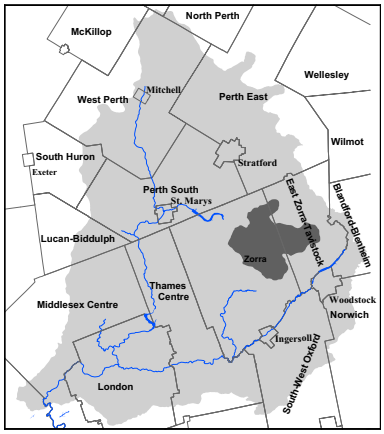
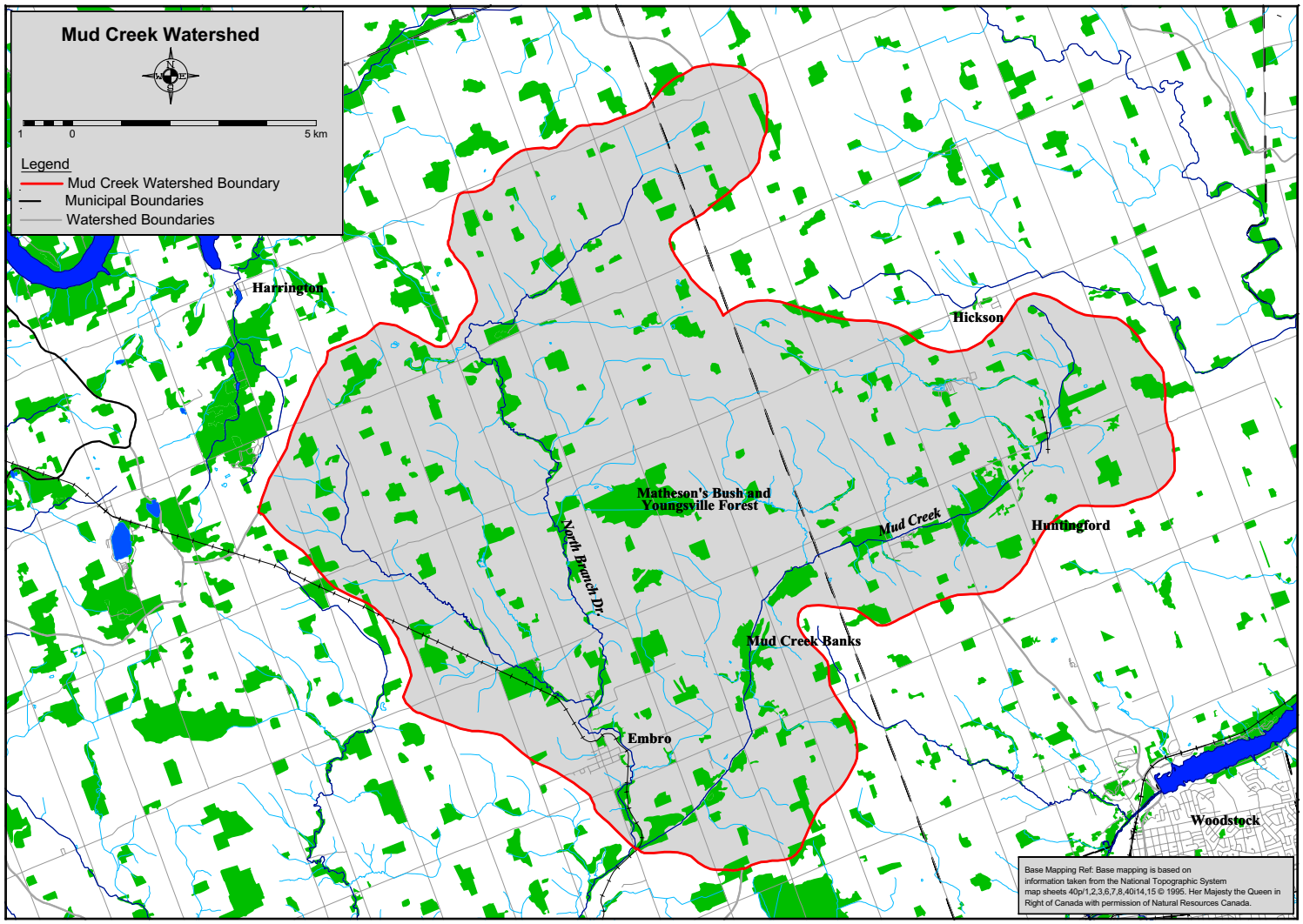
Mud Creek Watershed Report Card



This report card outlines environmental information for the Mud Creek 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**
C	**Surface Water Quality**



Municipalities: Zorra Twp (108 sq. km), East Zorra-Tavistock (44 sq. km)
Watercourses: Mud Creek, North Branch Drain, both of which feed into the Middle Thames River

Grade D

Forest Conditions

Overall, forest conditions in the Mud Creek watershed score a D grade and the three indicators have grades from C to D (see table below). The amount of forest cover (12%) 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 fair, indicating some of the woodlots are close enough to each other to allow seeds to be transported and animals to move between them. There are still many woodlots that are isolated from other wooded areas. Forest interior is low indicating that most of the woodlots are too small and narrow to support sensitive species that need to live in large protected habitats. Approximately 74% of woodlots are under 10 hectares in size.

Indicators	Mud Creek Results		Upper Thames Watershed Average		Indicator Description
Forest Cover	12%	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	77%	C	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	1.7%	D	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 can be achieved through designations in Official Plans, enforcement of tree cutting by-laws, protective zoning and other appropriate planning measures.

- 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). This action is important in this watershed where 74% of the woodlots are under 10 hectares in size.

- Matheson's Bush and Youngsville Forest are the largest wooded areas in the watershed and hold the greatest potential for wildlife habitat. With landowner cooperation, enhancement projects should be targeted in and around these sites. For example, Matheson's Bush could be linked *via* hedgerows and windbreaks to the large wooded blocks to the north that connect to Wildwood CA. Youngsville Forest should be connected to the North Branch Drain a short distance away. Biological inventories of these sites may also help determine their management needs.

- The Mud Creek Banks Wetland is another significant site that extends, in patches, along the entire length of Mud Creek. Planting or naturalizing the patches between the wooded areas would create a continuous corridor of green, benefiting both aquatic and terrestrial wildlife. This creek could serve as a model of a well vegetated watercourse.

- Connections can be made between woodlots and other habitats by planting hedgerows and windbreaks along fields, roads and watercourses.

Farm woodlot

Grade C

Surface Water Quality

Water quality in the Mud Creek watershed ranks a C with the four indicators ranging from B to D (see chart below). This watershed is ranked in the upper range of the 28 subwatersheds for water quality. Much of the headwaters and the upper main channel of both Mud Creek and North Branch Creek are high quality, with permanent cool, or coldwater flows. However, water quality in the rest of this watershed has deteriorated over the past 30 years. Nitrates, suspended solids, conductivity, and fecal bacteria all show increasing trends. Fecal coliform bacteria were within the provincial guideline until 1990, after which they increased, indicating contamination from human/animal sources. Since there is no water quality monitoring station at the downstream end of this watershed, bacteria and water chemistry data are taken from the station located in the lower Middle Thames subwatershed.

Indicators	Mud Creek Results		Upper Thames Watershed Average		Provincial Guideline	Indicator Description
Benthic Score (FBI)	5.47	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)	0.05*	B	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)	203*	C	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)	655*	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 the recommendations of *The Thamesford and Embro Stormwater Management Planning Study* (UTRCA, 1996) and the *Thamesford and Embro Storm Water Management Requirements*.
- Add a flow monitoring station and a water quality monitoring site at the downstream end of the watershed to adequately assess changes in water quantity and quality.
- Plant buffers (grassed or treed) along all open drains, creeks, and rivers to filter runoff and provide shade. Target the rehabilitation of the headwaters and upper main channel of Mud Creek and North Branch Creek.
- Implement protection of identified groundwater recharge zones, protect groundwater discharge points, and continue with groundwater research and monitoring (refer to *Oxford County Groundwater Study*, 2000)
- Encourage the decommissioning of abandoned wells according to Ministry of the Environment standards.
- Target soil erosion measures to areas of high erodibility (20% of the land within this watershed is classified as highly erodible compared to Upper Thames River watershed average of 9%).
- Assess the purpose of the 10 dams to determine if any should be removed or modified to improve river health.
- Encourage environmentally sustainable practices on golf courses (e.g. Audubon Cooperative Sanctuary Program).
- Encourage drain maintenance and design procedures that protect water quality (e.g. careful timing of work, proper use of silt traps, maintaining existing vegetation where possible, use of natural channel design).
- The following actions should be targeted in Embro:
  - encourage a municipal sanitary servicing strategy;
  - repair or replace faulty septic systems;
  - implement stormwater management plans for all new urban developments and implement projects to reduce stormwater runoff (e.g. through infiltration ponds, pavement alternatives, etc);
  - encourage river clean-up /stream stewardship projects to improve the 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.

Mud Creek Watershed Features

Area	152sq. km (4.4% of Upper Thames River watershed)
Land Use	87% agriculture, 12% wooded, 1% urban (GIS derived using OMAFRA Landuse Systems, 1983)
Soil Type	68% silt loam, 25% sandy loam, 3% loam, 3% bottomland, 2% clay loam, 1% organic (GIS derived using county soil maps)
Soil Erosion/Delivery	20% 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 derved using 1991 Geomatics data)
Physiography	75% drumlinized till plain, 24% spillway, 1% drumlins (Chapman and Putnam, 1984)
Stream Flow	No stream flow data is available for Mud Creek. (Environment Canada, 1998)
Groundwater	Shallow (<18m) aquifers are found along both Mud Creek and North Branch Drain. There are also two extensive intermediate (18-45m) aquifers, one just east of Embro and the other found west of Brooksdale. Three small deep overburden (>45 m) aquifers are found at the north end of the watershed near Brooksdale, Braemar and Huntington. (MOE 1981).
Fishery Resources	A total of 26 fish species have been recorded, including Brook Trout and Smallmouth Bass . Much of the headwaters and the upper main channel of both Mud Creek and North Branch Drain have permanent, cool or coldwater flows.
Dams	10 dams are documented in this watershed including the Embro Conservation Area Dam. The other dams are privately owned. (UTRCA, 1991)
Sewage Treatment	There are no sewage treatment plants in this watershed. All properties are serviced by private septic systems.
Woodlot Size	52% of the woodlots are very small (<4 ha), 22% are small (4-10 ha), 17% are mid-sized, 3% are large (30-40 ha), and 6% are very large (>40 ha). (GIS derived using 1997 NTS maps)
Riparian Forest	24% of the riparian zone (20 metres on either side of all watercourses) is forested. The average for the Upper Thames River watershed is also 24%. (GIS derived using 1997 NTS maps)
Rare Species	Fish – Greenside Darter Reptiles – Spotted Turtle (ROM, UTRCA and NHIC, 2000)
Significant Natural Sites	**Provincially Significant Wetlands** — Matheson's Bush **Locally Significant Wetlands** – Mud Creek Banks Wetland, Youngsville Forest **Significant Natural Areas** – none **Earth Science Areas of Natural and Scientific Interest** – Mud Creek Meltwater Channel, Brooksdale Glacial Complex (MNR and UTRCA 1996, County ESA reports)

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

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