

A Natural History of Cambridge, Ontario

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1) INTRODUCTION

This paper reviews the major natural environmental factors that have been determinants of the character and settlement of Cambridge, Ontario. Additionally, we describe a project that prepared a guide entitled, "Natural Heritage Tour" so that residents can visit and develop an appreciation for the area's major features and remaining ecological resources. In this paper, we explain first the geology and glacial geomorphology and, then, the watersheds and the vegetation of Cambridge and the surrounding area. The natural areas that do remain are representative of the conditions we describe and are often easily accessible.

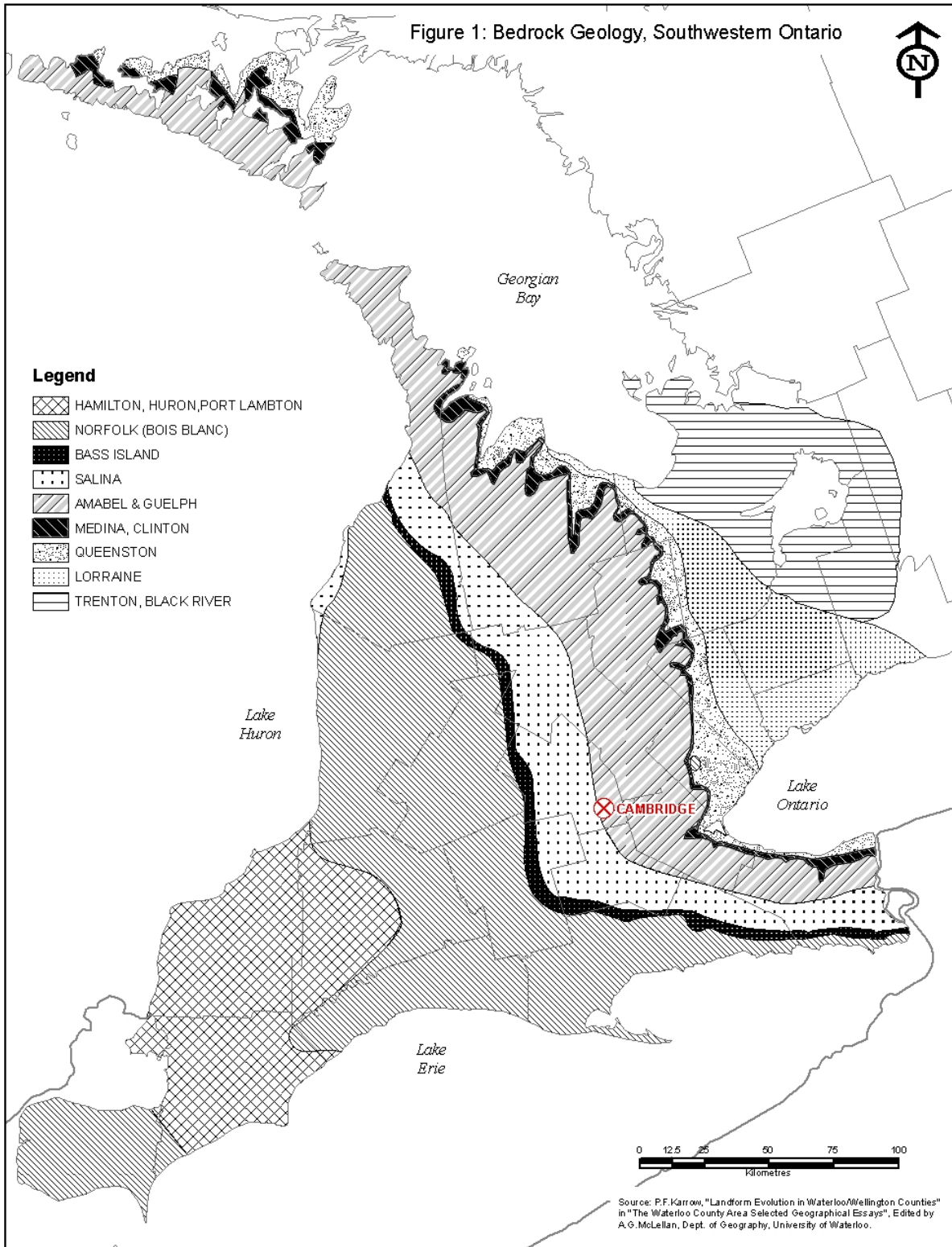
2) GEOLOGY and GLACIATION: "THE FOUNDATION"

Underlying the current surface of the land in Cambridge are a variety of conditions that have influenced settlement here.

Generally at depths of as much as 100 metres in the Waterloo Region are different types of bedrock. Figure 1 in (adapted from Karrow, 1971) shows the distribution of bedrock types in southern Ontario. These different rocks are actually layered on top of each other and slope towards the southwest. If you know the Niagara Escarpment at Milton which you are likely to pass regularly on provincial highway 401, you will see an exposure of the bedrock type (Guelph and Amabel "dolomite" formation) that is the upper layer beneath Cambridge. This dolomite is a harder rock than the underlying layer (i.e. Queenston shales) resulting in the erosion of the softer and lower shales and the formation of the Escarpment. These rocks were deposited as muds in a marine (saltwater sea) approximately 500 million years ago during the Paleozoic Era.

There are exposures of this Guelph dolomite along the Grand River in Cambridge and to the east where more recent overlying glacial deposits are thin. The surface of the bedrock is not uniform or flat and there are valleys cut into the rock, such as along the Grand River.

There are three influences in Cambridge from bedrock type and its character. First, the bedrock valley was a major factor in determining water flows and influenced the glacial history, as we shall see. Second, the porous nature of the rock makes it a good water bearing formation so that it has been tapped for water supply as the community has grown. Cambridge in particular, and the Waterloo Region generally are noted and fortunate to have such a large supply of ground (rather than surface) water as the source of drinking water. This water is high quality, but is hard due to the dissolved carbonates from the rock. There is a need to protect this groundwater resource from potential contamination due to surface activities.



The final influence of Cambridge from the bedrock is the ready source of workable rock that it provided. The buildings and structures in Cambridge attest to the quality of the stone for this purpose and the skill of its craftsmen.

Another major factor determining Cambridge's environmental character was the last period of the Wisconsin glaciation, approximately 11,000 years ago. At that time, a continental ice sheet thousands of feet thick extended from the north to well south of the Great Lakes. Ice movement and melting created a varied topography and geological environment. Movements of the glaciers out of the basins of the current Great Lakes pushed "unconsolidated" geological materials outward to create layers over the bedrock and "end moraines" where the advances stopped. The flatter areas of these glacial "tills" (poorly sorted mixed clays, silts, sands, rock, etc.) became productive agricultural lands. The Paris and Galt moraines are stony ridges and hummocks with "kettle" depressions less suited to agriculture that were formed by ice advances moving northwest out of the Lake Ontario basin.

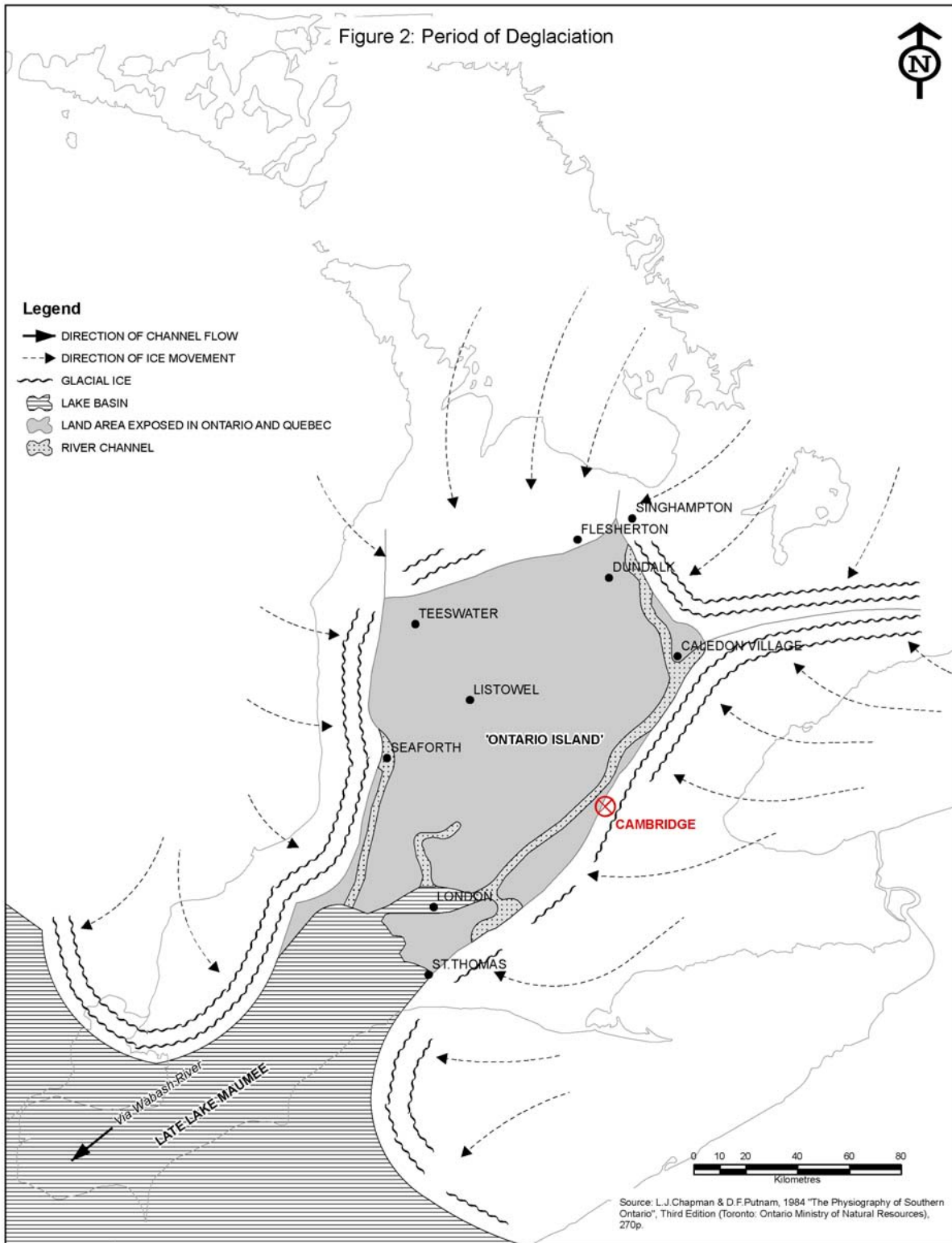
3) MELTWATERS: "THE STRUCTURE"

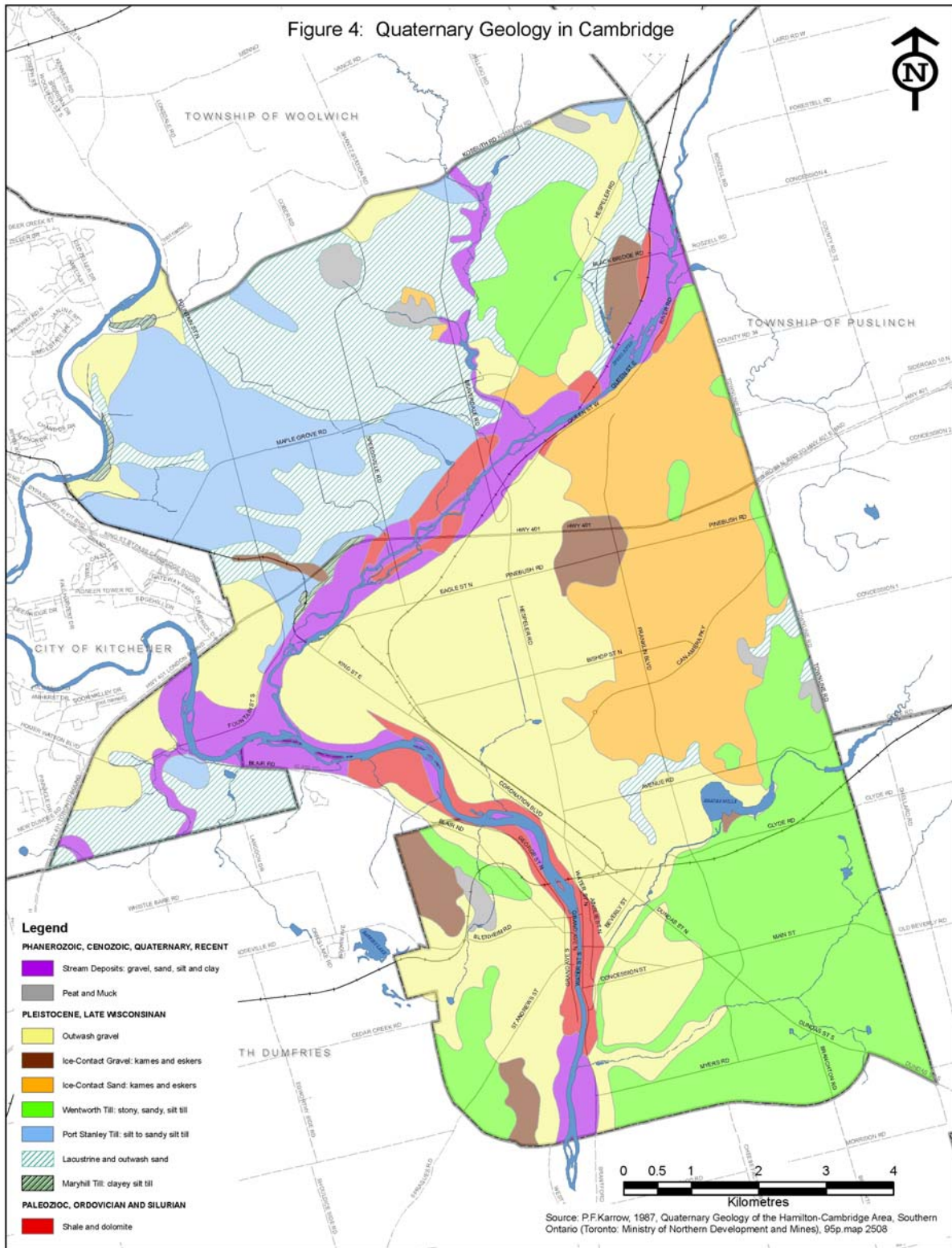
Water from the melting of these glaciers was perhaps the biggest factor in this evolution of the Cambridge landscape. At the edge of the ice sheets, sands and gravels were carried over and through the ice to be deposited on the land surface or carried as the ice melted. A major discharge channel carried the water from large parts of southern Ontario down the Mississippi drainage, as the St. Lawrence outlet was blocked by the ice. Figure 2 (from Chapman and Putnam, 1984) generally illustrates this factor in southern Ontario. These flows of water carved the major river valleys through Cambridge and deposited extensive and high quality stones and gravels. Today's Speed and Grand rivers drain very large areas following these former meltwater channels.

Figure 3 (from Karrow, 1971) shows the location of Cambridge in relation to the moraine pattern in southwestern Ontario. The Galt and Paris moraines are a major landform visible today in the south east part of the city.

Figure 4 (adapted from Karrow, 1987) is more specific to Cambridge and shows in detail the areas of sands and gravels along the Hespeler Road and Pinebush Road /Eagle Street axes. Major gravel pits were operated and rehabilitated here. West of Cambridge in North Dumfries Township there are related major aggregate deposits. There is a "kame " feature over towards Franklin Boulevard and north of the 401.

Up in the Maple Grove Road area and towards the airport, layers of sands were deposited over the underlying tills. These types of soils are, of course, ideal for growing potatoes and as sod farms. Towards the south, the major flows cut through the Galt Moraine and created the dramatic Grand River valley that occurs in the south end. As mentioned earlier, the underlying bedrock was also exposed by these river flows.



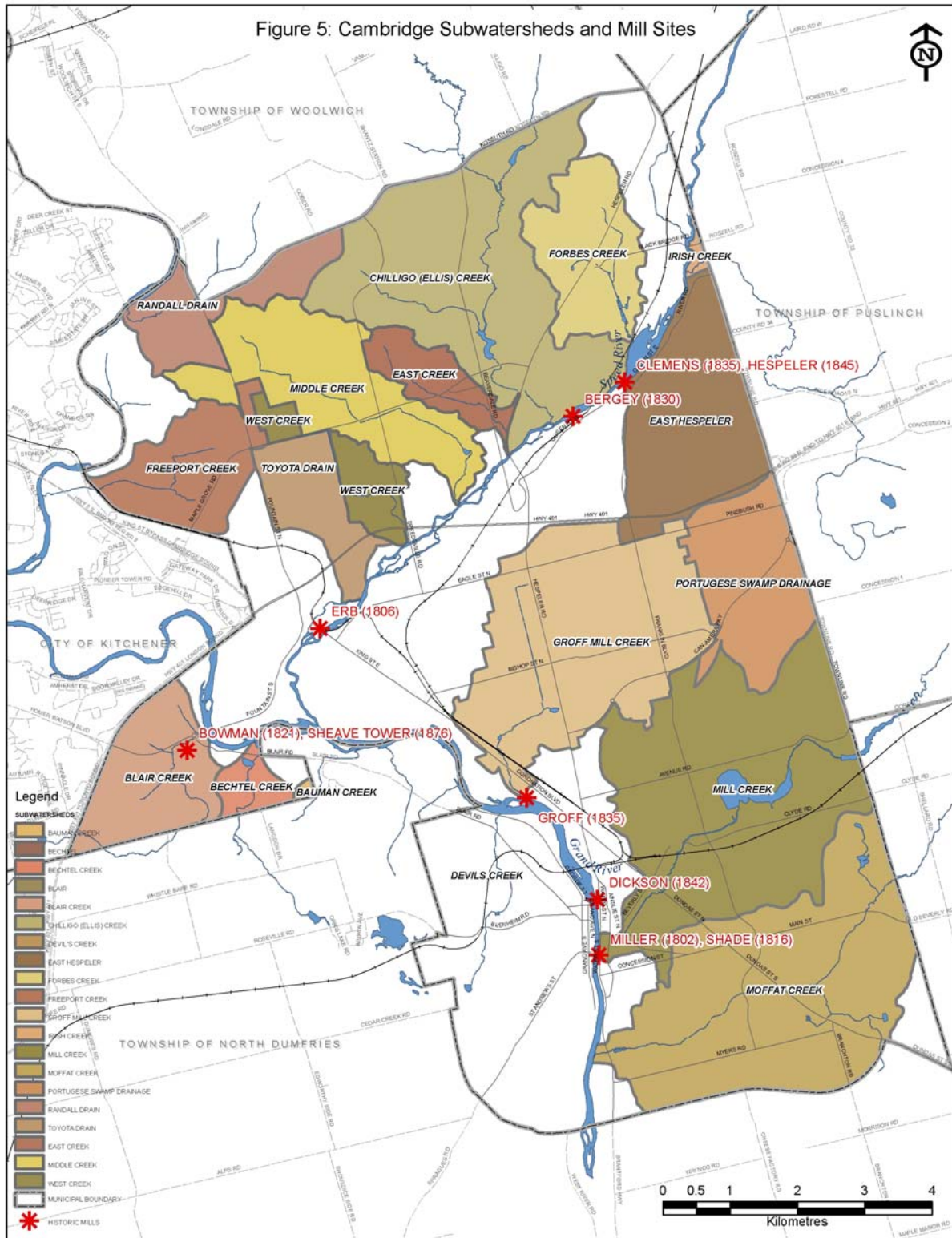


The watersheds that developed after the glaciation are also an interesting feature of Cambridge. Of course, the Speed and Grand Rivers were major attractants as they served as routes of travel and provided the opportunities for mill sites. However, a number of small watersheds are also of interest to us as illustrated on Figure 5.

Mill Creek, Devil's Creek, Blair and Bechtel Creeks and Irish Creek all had their sources in the areas of extensive sand and gravel deposits. These created attractive and high quality waters as the rains infiltrate rather than running off and are cooled by their pathway through the soils. These streams support coldwater fish communities, including brook trout. Mill Creek is certainly the most substantial of these smaller streams as its watershed stretches east all the way to Highways 401 and 6 and because its watershed is between the Galt and Paris moraines where the soils were poor and much natural vegetation remains.

Groff Mill Creek, while it was likely of higher quality, has deteriorated due to the extensive development in its headwaters along Hespeler Road. Moffat Creek and the watersheds to the north (Forbes, etc.) are in watersheds that are less permeable, the landscape is agricultural and the flows more variable with the result that the waters are not of the same quality.

The flows along the Grand and Speed Rivers and the small watersheds tumbling down to the valley provided opportunities for mill sites. In the early nineteenth century, streams and rivers provided the force to power machinery and industry and Cambridge had an abundance. Cambridge's location at the confluence of several tributaries of the Speed and Grand Rivers resulted in the early mill locations shown on Figure 5. Settlements founded by William Dickson (Galt), John Erb (Preston) and Michael Bergy (Hespeler) grew around these sites. The successors to these early settlements were, of course, amalgamated in 1973 to form the City of Cambridge.



4) VEGETATION: “SETTLEMENT AND THE LANDSCAPE”

The vegetation that established in the landscape after the glaciation succeeded by natural processes over 10,000 years into the extensive forests found at the time of settlement. Cambridge is located on the general boundary between two major forest regions: the Carolinian or Deciduous Forest Region to the south dominated by hardwoods and the northerly Great Lakes – St. Lawrence Forest Region dominated by conifers along with northern hardwood trees. There are also rare herbaceous plants that are typical of more southerly areas.

The original forests were both a source of materials for the early settlers and a hindrance to agriculture. The back-breaking task of clearing the lands left only pockets of forests where the soils were poor for agriculture – too steep, stony or poorly drained - and along the back lot lines (there was a requirement to clear the frontage on lots first to assist in road construction).

Statistics from the Census of Canada show that by 1850 only 31% of the original forest in North Dumfries Township remained and that by 1900 that had shrunk to 12%. Since 1910-20, the extent of forest in southern Ontario has actually increased as agricultural lands have been abandoned and reforested or allowed to naturally regenerate (see Figure 6A and 6B). The figures show the general pattern of land clearing and the current general distribution of forest lands in southern Ontario.

There are descriptions of the early forest in several types of accounts. Early settlers often commented on the character of the woods. Some of these are summarized in the Nith Valley Conservation Report (1951). Detailed descriptions were required of the early land surveyors who described the qualities of the lands as settlers relied on the descriptions to select their preferred lands (i.e. trail of the black walnut). This information has been compiled from the 1817 survey for North Dumfries in a paper (Clarke, 1969) that is on file at the University of Waterloo. The forests that were present before settlement included three main types maple, beech, basswood and elm on upland areas; white pine, white oak and red oak on drier, sandy areas and white cedar, tamarack and black ash on poorly drained lands. Interestingly, from Cambridge south, there were extensive areas of prairie and oak savannah (grasslands with scattered trees) that supported wildlife species such as buffalo. These areas were culturally maintained (burned) by the aboriginal communities.

We are also fortunate to have extensive notes from early naturalists (John Goldie (1793-1886), William Herriott (1870-1930) and F.H. Montgomery (1902-1978)) who were interested in our area. These early observations are being searched by local naturalists so as to locate the heritage sites and species.

5) TODAY: “THE REMNANTS – WHAT’S LEFT”

It should be appreciated, the character of Cambridge has been determined by major environmental factors described above (glacial deposits, meltwater channels, hardwood forests, etc.) and how the settlers took advantage of the resources. Early settlers to the

Figure 6A: General Pattern of Change in Forest Cover in Southern Ontario (From: FON)

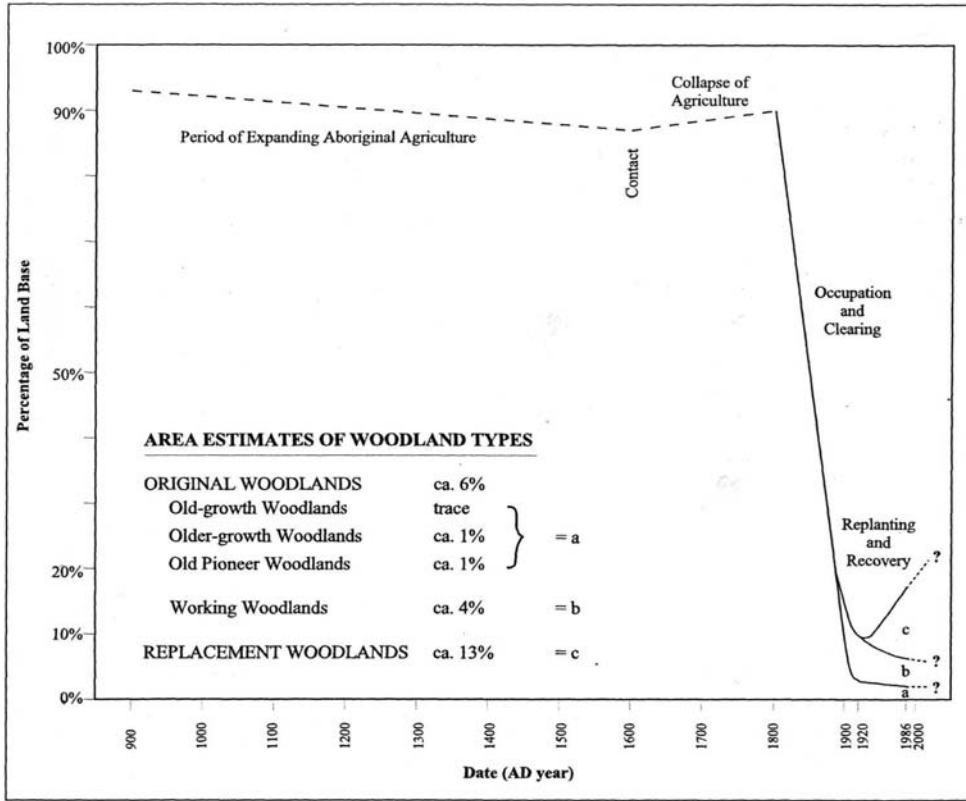
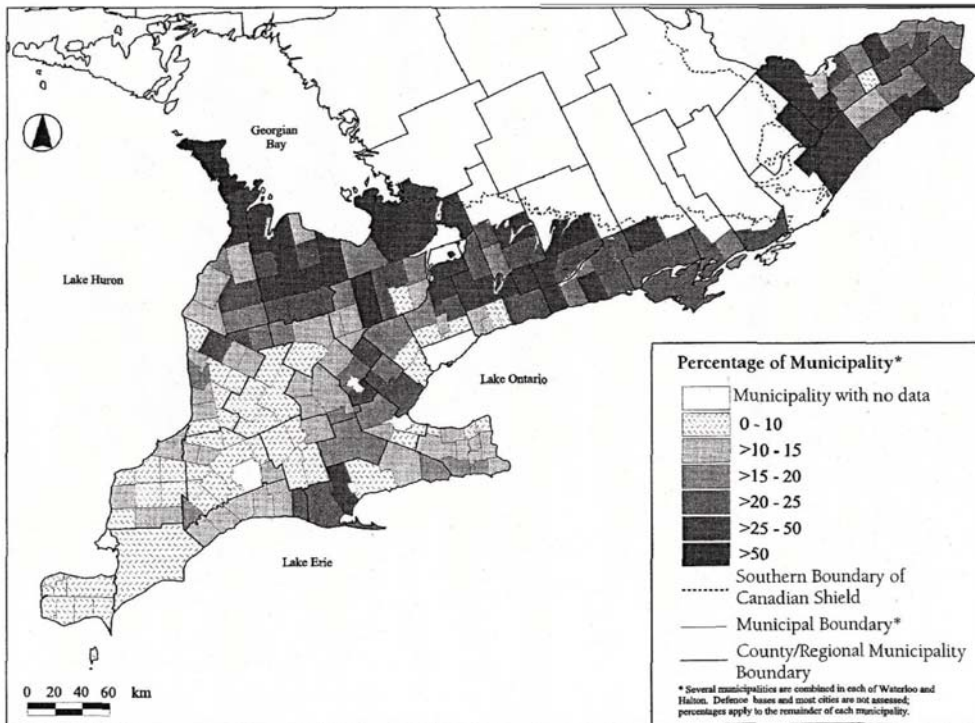


Figure 6B: Total Woodlands (Upland and Wetland) South and East of the Canadian Shield, 1978 (From: FON)



region found that the till (mixture of rock and unconsolidated material deposited by the ice sheets) which underlay the area's good farmland produced a "crop" of stones which rose to the surface each year after the annual freeze/thaw cycle. These stones were removed and piled along the edges of fields, forming a grid pattern of "hedgerows". Large trees grew up in these uncultivated lands and are preserved today in the southeast Galt area of the city being developed as a residential community between Main Street East and Dundas Street South, east of Franklin Boulevard. The power of flowing rivers like the Grand and the Speed as well as their tributaries was extensively used for mills producing everything from flour to textiles. The Sheave Tower on Blair Creek and the Hespeler Mill Pond on the Speed River remain today as testaments to this use of perhaps the area's greatest resource, its watercourses. Many of the forests that originally covered the area are gone today, cleared for agriculture and hewn for homes, furniture and other products.

Remnants of the natural upland cover of the region dominated by sugar maple, American beech, basswood, white ash, oaks, eastern hemlock and white pine can be found in city parks like the Dumfries Conservation Area, Victoria Park and the Schiedel Woodlot. The remnant lowlands containing silver maple, white elm, black ash and white cedar can be found at Portuguese Swamp and the Boxwood Woodlot. Because Cambridge is located close to the next region to the south, the Deciduous Forest Region – there are occurrences of a number of species that are common in more southern climates. These are often referred to as Carolinian. Examples of this vegetation can be found at A. Wayne Taylor Park and Moyer's Landing. More unusual habitat types such as alvar communities developed on shallow soils over limestone are found at **rare**, and unusual prairie plants can be seen in Churchill Park.

6) DOCUMENTATION: "THE NATURAL HERITAGE TOUR"

The Natural Heritage Tour booklet had its origins in the Council-appointed Legacy Cambridge committee charged with identifying and achieving priority action items in the interest of Cambridge's natural and built heritage. A tour to familiarize committee members with several natural heritage sites in the city evolved into a 10th anniversary project of the Cambridge Environmental Advisory Committee (CEAC). Cambridge City Council established CEAC in 1992. It is comprised of 12 members, two of whom are members of Cambridge Council, together with 10 other Cambridge citizens, chosen on the basis of their expertise, interest in and/or familiarity with the local environment. The purpose of the committee is to advise Cambridge City Council of ways to protect, maintain and enhance the natural environment in harmony with the built environment.

Each member of CEAC and the City's Senior Environmental Planner contributed text for each of the twenty-nine remnant natural heritage sites featured in the Cambridge Natural Heritage Tour. The introduction to the tour describes the importance of glaciation in forming the landscape that is seen today. Examples of glacial features like drumlins, moraines, kames and kettle lakes are included in the booklet. Of course, the two major rivers, the Speed and the Grand are highlighted at sites like the Hespeler Mill Pond at Ellacott Lookout and Settlers' Fork. These rivers were the lifeblood and reason

for the original settlement (pre-and post-European) of the area. High quality streams like Devil's and Blair Creek which have their sources in sands and gravels and extensive natural vegetative cover are included. Moving from the foundation provided by glaciation and the structure provided by meltwaters, the occupation by vegetation is shown in forested areas like Victoria Park and the Schiedel Woodlot, the lowlands of Portuguese Swamp and "Carolinian" sites like A. Wayne Taylor Park and Moyer's Landing.

Funding to produce the Natural Heritage Tour booklet was provided by the City of Cambridge, TD Friends of the Environment Foundation and an anonymous donor from the community. Photographs, which are featured throughout the full colour document, were contributed by over a dozen local photographers. A pullout map in the centre of the booklet guides the user from the first site in the centre of the city (Dumfries Conservation Area) to the terminus at the Middleton Pumping Station (circa 1890) on the west side of the Grand River. A local graphic designer, Greg Pautler, a lifelong resident of Cambridge with a passion for the past and present of the former Town of Preston, contributed many ideas which resulted in the final design.

The tour booklet has been distributed, free of charge, throughout the community. The Cambridge Farmers' Market, local libraries, Grand River Conservation Authority Administration Headquarters and Cambridge Tourism Centre are some of the locations that the tour booklet is distributed from. The Cambridge Environmental Advisory Committee is planning to distribute the booklet to local schools, with an offer to donate time to take classrooms to local sites with site-specific information. A website with interactive mapping and public transit options for visiting sites is in the works. The Cambridge Natural Heritage Tour is truly a community-based education initiative that aims to develop an appreciation for and advocacy of the area's unique and interesting natural heritage.

The map from the guide is included with this paper and full copies of the booklet are available at the City's Planning Services Department.



Figure 7: Natural Heritage Tour Route, Sites and Greenspaces in Cambridge

7) SUMMARY

The natural history of Cambridge, Ontario results in the varied landscape features and vegetation that contributes to the City's natural beauty. An explanation of the underlying geology and results of glaciation contributes to an understanding of the area's early settlement pattern and features visible today. The Cambridge Environmental Advisory Committee's "Natural Heritage Tour" booklet takes the reader on a city-wide tour of 29 remnant natural heritage sites. It is intended to assist residents and visitors alike to gain a greater understanding and appreciation for the local environment and to promote its stewardship.

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