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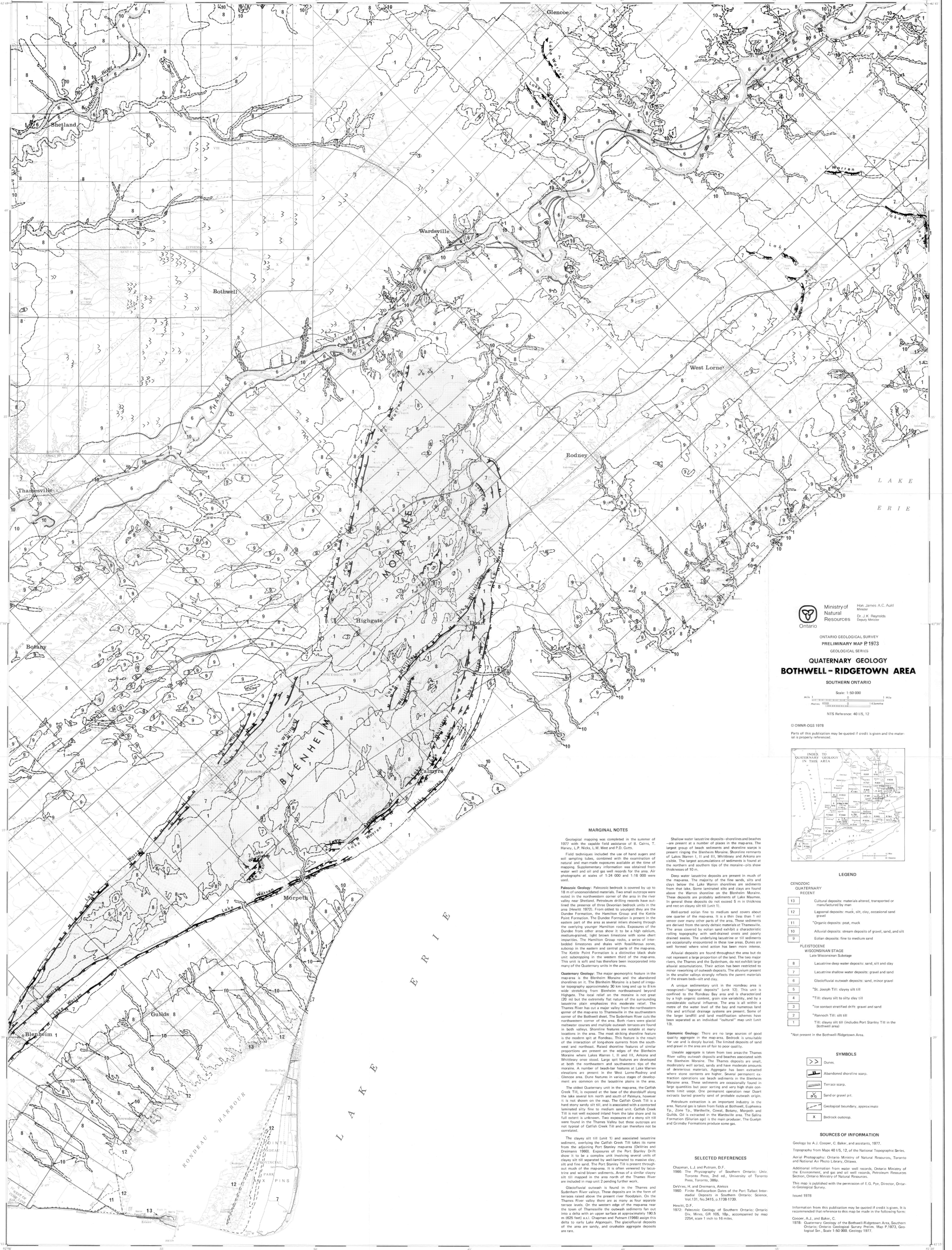
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ONTARIO GEOLOGICAL SURVEY
PRELIMINARY MAP P 1973
 GEOLOGICAL SERIES
QUATERNARY GEOLOGY
BOTHWELL - RIDGETOWN AREA
 SOUTHERN ONTARIO

Scale: 1:50 000
 1:50 000
 1:50 000
 NTS Reference: 40 I/5, 12

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LEGEND

CENOZOIC QUATERNARY	
RECENT	
13	Cultural deposits: materials altered, transported or manufactured by man
12	Lacustrine deposits: silt, clay, occasional sand and gravel
11	*Organic deposits: peat, muck
10	Alluvial deposits: stream deposits of gravel, sand, and silt
9	Eolian deposits: fine to medium sand
PLEISTOCENE WISCONSINIAN STAGE	
8	Lacustrine deep water deposits: sand, silt and clay
7	Lacustrine shallow water deposits: gravel and sand
6	Glaçifluvial outwash deposits: sand, minor gravel
5	*St. Joseph Till: clayey silt till
4	*Till: clayey silt to silty clay till
3	*Loess contact stratified drift: gravel and sand
2	*Ranch: Till: silt till
1	*Till: clayey silt till (includes Port Stanley Till in the Bothwell area)

*Not present in the Bothwell-Ridgetown Area.

SYMBOLS

	Dunes
	Abandoned shoreline scarp
	Terrace scarp
	Sand or gravel pit
	Geological boundary, approximate
	Bedrock outcrop

SOURCES OF INFORMATION

Geology by A.J. Cooper, C. Baker, and assistants, 1977.
 Topography from Maps 40 I/5, 12, of the National Topographic Series.
 Aerial Photography: Ontario Ministry of Natural Resources, Toronto and National Air Photo Library, Ottawa.
 Additional information from water well records, Ontario Ministry of the Environment, and gas and oil well records, Petroleum Resources Section, Ontario Ministry of Natural Resources.
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 Issued 1978

MARGINAL NOTES

Geological mapping was completed in the summer of 1977 with the capable field assistance of S. Cairns, T. Harvey, L.P. Hicks, L.W. West and P.D. Cunniff. Field techniques included the use of hand augers and soil sampling tubes, combined with the examination of natural and man-made exposures available at the time of mapping. Supplementary information was obtained from water well and oil and gas well records for the area. Air photographs at scales of 1:24 000 and 1:16 000 were used.

Paleozoic Geology: Paleozoic bedrock is covered by up to 18 m of unconformated materials. Two aerial outcrops were noted in the northwestern corner of the area in the river valley near Shetland. Petroleum drilling records have outlined the presence of three Devonian bedrock units in the area (Hevitt 1972). From oldest to youngest they are the Dundee Formation, the Hamilton Group and the Kettle Point Formation. The Dundee Formation is present in the eastern part of the area as several ridges showing through the overlying younger Hamilton rocks. Exposures of the Dundee from other areas show it to be a high calcium, medium-grained, light brown limestone with some chert impurities. The Hamilton Group rocks, a series of interbedded limestones and shales with fossiliferous zones, subcrop in the eastern and central parts of the map-area. The Kettle Point Formation is a distinctive black shale unit subsiding in the western third of the map-area. This unit is soft and has therefore been incorporated into many of the Quaternary units in the area.

Quaternary Geology: The major geomorphic feature in the map-area is the Blenheim Moraine and the abandoned shorelines on it. The Blenheim Moraine is a band of irregular topography approximately 20 km long and up to 1 km wide stretching from Blenheim northeastward beyond Highgate. The local relief on the moraine is not great (20 m) but the extremely flat nature of the surrounding lacustrine plain emphasizes this moderate relief. The Thames River has cut a major valley from the northeastern corner of the map-area to Thamesville in the southwestern corner of the Bothwell sheet. The Sydenham River cuts the northwestern corner of the area. Both rivers were glacial meltwater courses and multiple outwash terraces are found in both valleys. Shoreline features are notable at many locations in the area. The most striking shoreline feature is the modern silt at Ridgetown. This feature is the result of the interaction of longshore currents from the south-west and northeast. Raised shoreline features of similar proportions are present at the edges of the Blenheim Moraine where Lakes Warren I, II and III, Arkona and Whittney once stood. Large silt features are developed at both the northeastern and southwestern tips of the moraine. A number of beach-bar features at Lake Warren locations are present in the West Lorne, Rodney and Glencoe areas. Dune features in various stages of development are common on the lacustrine plains in the area.

The oldest Quaternary unit in the map-area, the Catfish Creek Till, is exposed at the base of the shoreface along the lake several km north and south of Palmyra, however, it is not shown on the map. The Catfish Creek Till is a hard stony silty till, and is associated with a contorted laminated silt fine to medium sand unit. Catfish Creek Till is not well exposed inland from the lake shore and its full extent is unknown. Two exposures of a stony silt till were found in the Thames Valley but these outcrops are not typical of Catfish Creek Till and can therefore not be correlated.

The clayey silt till (unit 1) and associated lacustrine sediment, overlying the Catfish Creek Till takes its name from the adjoining Port Stanley map-area (DeVries and Chapman 1960). Exposures of the Port Stanley Drift show it to be a complex unit involving several units of clayey silt till separated by well-laminated massive clay, silt and fine sand. The Port Stanley Till is present throughout much of the map-area. It is often associated by wind-blown sediments. Areas of a similar clayey silt till mapped in the area north of the Thames River are included in map unit 2 and/or further work.

Shallow water lacustrine deposits—shorelines and beaches are present at a number of places in the map-area. The largest group of beach sediments and shoreline scars is present along the Blenheim Moraine. Shoreline remnants of Lakes Warren I, II and III, Whittney and Arkona are visible. The largest accumulations of sediments is found at the northern and southern tips of the moraine—pits show thicknesses of 15 m.

Deep water lacustrine deposits are present in much of the map-area. The majority of the fine sands, silts and clays below the Lake Warren shorelines are sediments from that lake. Some laminated silts and clays are found above the Warren shorelines on the Blenheim Moraine. These deposits are probably sediments of Lake Maumee. In general these deposits do not exceed 5 m in thickness and rest on clayey silt till (unit 1).

Well-sorted silt to medium sand covers about one quarter of the map-area. It is a thin (less than 1 m) veneer over many other parts of the area. These sediments are derived from the sandy detrital materials at Thamesville. The areas covered by eolian sand exhibit a characteristic rolling topography, with well-drained crests and poorly drained swales. The underlying lacustrine or till sediments are occasionally encountered in these low areas. Dunes are well formed where wind action has been more intense.

Alluvial deposits are found throughout the area but do not represent a large proportion of the land. The two major rivers, the Thames and the Sydenham, do not exhibit large alluvial accumulations. Their action has been restricted to minor reworking of outwash deposits. The alluvium present in the smaller valleys strongly reflects the parent materials of the local bedrock and till.

A unique sedimentary unit in the Ridgetown area is recognized—"lagoonal deposits" (unit 12). This unit is confined to the Ridgetown Bay area and is characterized by a high organic content, grain size variability, and by a considerable cultural infill. The area is all within a metre of the water level of the bay and numerous land fills and artificial drainage systems are present. Some of the larger landfills and land modification schemes have been separated as an individual "outcrop" map unit (unit 13).

Economic Geology: There are no large sources of good quality aggregate in the map-area. Bedrock is unsuitable for use and is deeply buried. The limited deposits of sand and gravel in the area are of fair to poor quality. Usable aggregate is taken from two aggregate Thames River valley outwash deposits and beaches associated with the Blenheim Moraine. The Thames deposits are small, moderately well-sorted, and have moderate amounts of detrital materials. Aggregate has been extracted where stone content is higher. Some permanent extraction operations use beach sediments in the Blenheim Moraine area. These sediments are occasionally found in large quantities but poor sorting and very high shale contents limit usage. One permanent operation near Duart extracts bedded gravelly sand of probable outwash origin. Petroleum extraction is an important industry in the area. Natural gas is taken from fields at Bothwell, Euphemia, Zee, To, (the Woodville-Gowd), Botany, Morpeth and Glencoe. Oil is extracted in the Wardville area. The Salina Formation (Silurian age) is the main producer. The Guibin and Grimby Formations produce some gas.

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Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form:
 Cooper, A.J. and Baker, C.
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