

THESE TERMS GOVERN YOUR USE OF THIS DOCUMENT

Your use of this Ontario Geological Survey document (the “Content”) is governed by the terms set out on this page (“Terms of Use”). By downloading this Content, you (the “User”) have accepted, and have agreed to be bound by, the Terms of Use.

Content: This Content is offered by the Province of Ontario’s *Ministry of Northern Development and Mines* (MNDM) as a public service, on an “as-is” basis. Recommendations and statements of opinion expressed in the Content are those of the author or authors and are not to be construed as statement of government policy. You are solely responsible for your use of the Content. You should not rely on the Content for legal advice nor as authoritative in your particular circumstances. Users should verify the accuracy and applicability of any Content before acting on it. MNDM does not guarantee, or make any warranty express or implied, that the Content is current, accurate, complete or reliable. MNDM is not responsible for any damage however caused, which results, directly or indirectly, from your use of the Content. MNDM assumes no legal liability or responsibility for the Content whatsoever.

Links to Other Web Sites: This Content may contain links, to Web sites that are not operated by MNDM. Linked Web sites may not be available in French. MNDM neither endorses nor assumes any responsibility for the safety, accuracy or availability of linked Web sites or the information contained on them. The linked Web sites, their operation and content are the responsibility of the person or entity for which they were created or maintained (the “Owner”). Both your use of a linked Web site, and your right to use or reproduce information or materials from a linked Web site, are subject to the terms of use governing that particular Web site. Any comments or inquiries regarding a linked Web site must be directed to its Owner.

Copyright: Canadian and international intellectual property laws protect the Content. Unless otherwise indicated, copyright is held by the Queen’s Printer for Ontario.

It is recommended that reference to the Content be made in the following form: <Author’s last name>, <Initials> <year of publication>. <Content title>; Ontario Geological Survey, <Content publication series and number>, <total number of pages>p.

Use and Reproduction of Content: The Content may be used and reproduced only in accordance with applicable intellectual property laws. *Non-commercial* use of unsubstantial excerpts of the Content is permitted provided that appropriate credit is given and Crown copyright is acknowledged. Any substantial reproduction of the Content or any *commercial* use of all or part of the Content is prohibited without the prior written permission of MNDM. Substantial reproduction includes the reproduction of any illustration or figure, such as, but not limited to graphs, charts and maps. Commercial use includes commercial distribution of the Content, the reproduction of multiple copies of the Content for any purpose whether or not commercial, use of the Content in commercial publications, and the creation of value-added products using the Content.

Contact:

FOR FURTHER INFORMATION ON	PLEASE CONTACT:	BY TELEPHONE:	BY E-MAIL:
The Reproduction of Content	MNDM Publication Services	Local: (705) 670-5691 Toll Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	Pubsales@ndm.gov.on.ca
The Purchase of MNDM Publications	MNDM Publication Sales	Local: (705) 670-5691 Toll Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	Pubsales@ndm.gov.on.ca
Crown Copyright	Queen’s Printer	Local: (416) 326-2678 Toll Free: 1-800-668-9938 (inside Canada, United States)	Copyright@gov.on.ca

LES CONDITIONS CI-DESSOUS RÉGISSENT L'UTILISATION DU PRÉSENT DOCUMENT.

Votre utilisation de ce document de la Commission géologique de l'Ontario (le « contenu ») est régie par les conditions décrites sur cette page (« conditions d'utilisation »). En téléchargeant ce contenu, vous (l'« utilisateur ») signifiez que vous avez accepté d'être lié par les présentes conditions d'utilisation.

Contenu : Ce contenu est offert en l'état comme service public par le *ministère du Développement du Nord et des Mines* (MDNM) de la province de l'Ontario. Les recommandations et les opinions exprimées dans le contenu sont celles de l'auteur ou des auteurs et ne doivent pas être interprétées comme des énoncés officiels de politique gouvernementale. Vous êtes entièrement responsable de l'utilisation que vous en faites. Le contenu ne constitue pas une source fiable de conseils juridiques et ne peut en aucun cas faire autorité dans votre situation particulière. Les utilisateurs sont tenus de vérifier l'exactitude et l'applicabilité de tout contenu avant de l'utiliser. Le MDNM n'offre aucune garantie expresse ou implicite relativement à la mise à jour, à l'exactitude, à l'intégralité ou à la fiabilité du contenu. Le MDNM ne peut être tenu responsable de tout dommage, quelle qu'en soit la cause, résultant directement ou indirectement de l'utilisation du contenu. Le MDNM n'assume aucune responsabilité légale de quelque nature que ce soit en ce qui a trait au contenu.

Liens vers d'autres sites Web : Ce contenu peut comporter des liens vers des sites Web qui ne sont pas exploités par le MDNM. Certains de ces sites pourraient ne pas être offerts en français. Le MDNM se dégage de toute responsabilité quant à la sûreté, à l'exactitude ou à la disponibilité des sites Web ainsi reliés ou à l'information qu'ils contiennent. La responsabilité des sites Web ainsi reliés, de leur exploitation et de leur contenu incombe à la personne ou à l'entité pour lesquelles ils ont été créés ou sont entretenus (le « propriétaire »). Votre utilisation de ces sites Web ainsi que votre droit d'utiliser ou de reproduire leur contenu sont assujettis aux conditions d'utilisation propres à chacun de ces sites. Tout commentaire ou toute question concernant l'un de ces sites doivent être adressés au propriétaire du site.

Droits d'auteur : Le contenu est protégé par les lois canadiennes et internationales sur la propriété intellectuelle. Sauf indication contraire, les droits d'auteurs appartiennent à l'Imprimeur de la Reine pour l'Ontario.

Nous recommandons de faire paraître ainsi toute référence au contenu : nom de famille de l'auteur, initiales, année de publication, titre du document, Commission géologique de l'Ontario, série et numéro de publication, nombre de pages.

Utilisation et reproduction du contenu : Le contenu ne peut être utilisé et reproduit qu'en conformité avec les lois sur la propriété intellectuelle applicables. L'utilisation de courts extraits du contenu à des fins *non commerciales* est autorisée, à condition de faire une mention de source appropriée reconnaissant les droits d'auteurs de la Couronne. Toute reproduction importante du contenu ou toute utilisation, en tout ou en partie, du contenu à des fins *commerciales* est interdite sans l'autorisation écrite préalable du MDNM. Une reproduction jugée importante comprend la reproduction de toute illustration ou figure comme les graphiques, les diagrammes, les cartes, etc. L'utilisation commerciale comprend la distribution du contenu à des fins commerciales, la reproduction de copies multiples du contenu à des fins commerciales ou non, l'utilisation du contenu dans des publications commerciales et la création de produits à valeur ajoutée à l'aide du contenu.

Renseignements :

POUR PLUS DE RENSEIGNEMENTS SUR	VEUILLEZ VOUS ADRESSER À :	PAR TÉLÉPHONE :	PAR COURRIEL :
la reproduction du contenu	Services de publication du MDNM	Local : (705) 670-5691 Numéro sans frais : 1 888 415-9845, poste 5691 (au Canada et aux États-Unis)	Pubsales@ndm.gov.on.ca
l'achat des publications du MDNM	Vente de publications du MDNM	Local : (705) 670-5691 Numéro sans frais : 1 888 415-9845, poste 5691 (au Canada et aux États-Unis)	Pubsales@ndm.gov.on.ca
les droits d'auteurs de la Couronne	Imprimeur de la Reine	Local : 416 326-2678 Numéro sans frais : 1 800 668-9938 (au Canada et aux États-Unis)	Copyright@gov.on.ca



MARGINAL NOTES

INTRODUCTION
 Quaternary geological mapping in the Bath-Yorkshire Island area was carried out by the authors in the summer of 1982, assisted by R.A. Roy and A.M. Stachurski. This area was previously included in a regional geologic study of southern Ontario by Chapman and Punam (1951, 1966) and later was mapped by Myrnych (1978). The purpose of the present mapping is to update previous studies and provide a data base consistent with similar studies being carried out in Ontario.

Field techniques included the use of soil probes and hand augers, and the examination of natural and man-made exposures. Air photographs were used extensively in conjunction with field checking.

Detailed results of this mapping will be included in a geological report covering these and adjacent map areas (Sydenham (31 C7), Tweed (31 C6), Belleville (31 C3), Wellington (30 N14), Campbellford (31 C5), Toronto (31 C4), and Concession (30 N13); 1:50 000 NTS map sheets).

BEDROCK GEOLOGY
 Bedrock exposures (unit 2) in the map area are extensive. Four formations of the Simcoe Group outcrop in the area (Carson 1982, Liberty 87).
 The lithologies of the bedrock are mainly medium to thickly bedded or massive limestone, shaly limestone, and bioclastic limestone with some calcarenite.
 The bedrock has been strongly modified by glacial erosion resulting in a smooth often deeply grooved bedrock surface. Several bedrock escarpments are present in the area. These rock scarps have been strongly modified by glacial abrasion.

QUATERNARY GEOLOGY
Glacial Deposits
 Glacial deposits in the Bath-Yorkshire Island area are of Late Wisconsinan Age. The action of the glacial ice was mainly erosive in this area and as a consequence, very little glacial sediment was deposited. The thickest glacial deposits occur at the head of Hay Bay (Bay of Quinte) where they are estimated to be 20 to 30 m thick. Over the majority of this area, glacial sediments are generally <1 m thick.

Till
 The till of the area (unit 3) is moderately stony with a silty sand to sandy silt matrix. Relatively little till was deposited in the area. Most of the till present was deposited in the western part of the Bath area, north of the Bay of Quinte. The till lies directly on bedrock as its plan and is weakly to moderately drumlinized.

Several long, thin drumlins are present in the north central part of the map area. These drumlins may exceed 1 km in length while being on the order of 100 m wide and 8 to 10 m high.

Drumlin orientations, bedrock striae and grooves show a main ice movement direction to the southwest across the area.

Cross cutting striae, located approximately 4 km north of Bath, are evidence of a weak, late ice advance out of the Lake Ontario basin from the east-southeast. There was, however, no till deposited in the area by this late ice event.

Glacioluvial Deposits
 Two ice-contact deposits (unit 5) occur in the area. One small deposit occurs south of Hay Bay (Bay of Quinte) and a smaller one is located approximately 10 km east of Napanee. Two small outwash deposits (unit 6) are present in the Wilton Creek valley at the northern edge of the map area. This is the southernmost extension of a large outwash system to the north.

Glaciolacustrine Deposits
 Glaciolacustrine deep water deposits (unit 7) consisting of massive to laminated and sometimes varved silts and clays occur over the majority of this area. Generally these deposits are only about 1 m thick. Accumulations of over 20 m were noted along the Little Calaracook Creek in Kingston and the Napanee River at South Napanee. Both these streams are located along bedrock valleys which acted as sediment traps. Substantial thicknesses of silts and clays are also believed to occur within Hay Bay.

Nearshore sands (unit 8) occur in small deposits on the flanks of Cressy Point and west of Hay Bay. They were presumably deposited by long shore currents during high water stages. Thicknesses of up to 4 m have been observed at Cressy Point.

Raised shorelines are rare and scattered, occurring only in the western part of the map area. These deposits are usually in the form of thin strandlines. One small spit (unit 9) is present 4 km southwest of Napanee.

One older windblown sand deposit (unit 10) is present on the southern side of Cressy Point. This deposit is probably reworked from the adjacent nearshore sands.

Post Glacial Deposits
 Bog and swamp deposits (unit 12) occur in bedrock depressions and adjacent to modern shorelines. Modern alluvium (unit 13) is present in several river valleys but is restricted by steep bedrock valley walls.

ECONOMIC GEOLOGY
 Deposits of sand and gravel in the area are shallow and areally limited in extent. Most quarries in the area are abandoned, a few are active or intermittently active for aggregate production. Canada Cement Lafarge operates a large quarry near Bath for the production of cement.

Lacustrine clay sediments have been extracted from 3 now abandoned clay pits at South Napanee by Napanee Brick and Tile Works Limited.

REFERENCES
 Carson, D.M.
 1982. Paleozoic Geology of the Bath-Yorkshire Island Area, Southern Ontario. Ontario Geological Survey, Map P 2487, Geological Series-Preliminary Map, scale 1:50 000. Geology 1981.

Chapman, L.J. and Punam, O.F.
 1951. The Physiography of Southern Ontario. University of Toronto Press, 284p.

1966. The Physiography of Southern Ontario, Second Edition; University of Toronto Press, Toronto, 386p.

Liberty, S.A.
 1971. Paleozoic Geology of the Wolfe Island, Bath, Sydenham, and Ganarogue Map Areas, Ontario. Geological Survey of Canada, Paper 70-35, 12p.

Myrnych, E.
 1978. Surficial Geology of the Duck Island Area, Ontario. Geological Survey of Canada, Open File Report 545, Geology 1988-1980.

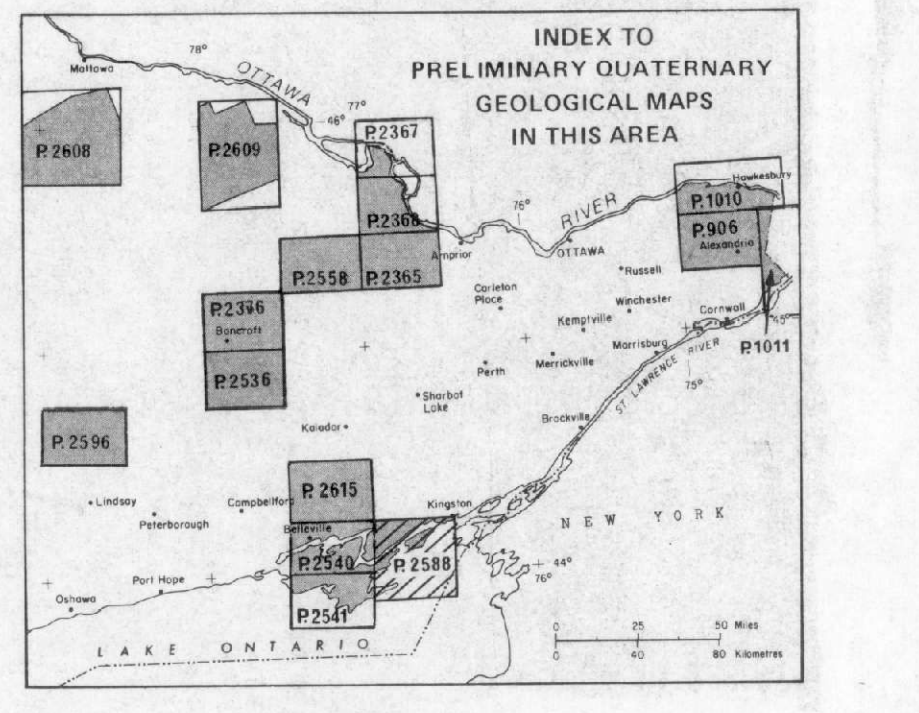
- SYMBOLS**
- Glacial striae, direction of ice movement known or assumed
 - Drumlin or drumlinoid ridge
 - Esker, direction of flow known or inferred
 - Abandoned beach ridge or nearshore bar
 - Geological boundary, approximate
 - Bedrock escarpment
 - Clay, sand or gravel pit, active, abandoned
 - Quarry, active, abandoned

Ontario Ministry of Natural Resources
 Hon. Alan W. Pope, Minister
 W.T. Foster, Deputy Minister

ONTARIO GEOLOGICAL SURVEY
 MAP P. 2588
 GEOLOGICAL SERIES - PRELIMINARY MAP
 QUATERNARY GEOLOGY
BATH-YORKSHIRE ISLAND AREA
 SOUTHERN ONTARIO

Scale 1:50 000
 NTS Reference: 31 C2, 30 N15
 OGM-GSC Aeromagnetic Map: 84033
 GCS Geological Compilation Map: 2418

©CMNR-OGS 1983
 Parts of this publication may be quoted if credit is given and the material is properly referenced.
 This map is published with the permission of E.G. Pye, Director, Ontario Geological Survey.



LEGEND

PHANEROZOIC	
CENOZOIC	
QUATERNARY	
RECENT	
15	Man-made deposits; predominantly fill
14	Modern shoreline deposits: 14a Beach deposits; sand, gravel 14b Windblown deposits; sand, silt
13	Modern alluvium; undivided; sand, silt, gravel, clay, muck
12	Organic deposits; peat, muck
PLEISTOCENE	
11	*Older fluvial deposits; gravel, gravely sand, sand
10	Windblown (eolian) deposits; sand, silt
9	Glaciolacustrine shoreline deposits 9a Beach bar sand gravel 9b Wave-planed deposits; lag gravels, sand, silt
8	Glaciolacustrine shallow water deposits; massive to laminated or bedded sand, silt
7	Glaciolacustrine deeper water deposits; massive to laminated silt, clay
6	Glacioluvial outwash deposits: 6a Proximal; sand, gravely sand, gravel 6b Distal; sand, gravely sand
5	Glacioluvial ice-contact deposits; gravel, gravely sand, minor silt, and fill
4	Till; very stony, variable matrix
3	Till; silty to sandy, moderately stony
UNCONFORMITY	
PALEOZOIC	
MIDDLE ORDOVICIAN	
2	Bedrock; exposed or with <1 m of drift cover
UNCONFORMITY	
PRECAMBRIAN	
1	*Bedrock; exposed or with <1 m of drift cover

*Units not present in this map area.

SOURCES OF INFORMATION
 Base map: Map 31 C2 and 30 N15 of the National Topographic Series.
 Aerial Photographs: Ontario Ministry of Natural Resources, Toronto, and National Airphoto Library, Ottawa.
 Additional information from water well records, Ontario Ministry of the Environment.
 Magnetic declination 12°05' W in 1982.

CREDITS
 Geology by J.G. Leyland, T.S. Russell, and assistants, 1982.
 Every possible effort has been made to ensure the accuracy of the information presented on this map; however, the Ontario Ministry of Natural Resources does not assume any liability for errors that may occur. Users may wish to verify critical information; sources include both the references listed here, and information on file at the Resident or Regional Geologist's office and the Mining Recorder's office (except the map area).

This project was part of the Southeastern Ontario Geological Survey (SOGS) which was funded equally by the Federal Department of Regional and Economic Expansion (DREE) and the Ontario Ministry of Natural Resources under the Minerals Program of the Eastern Ontario Subsidary Agreement.

Issued 1983
 Information from this publication may be quoted if credit is given. It is recommended that reference be made in the following form:
 Leyland, J.G. and Russell, T.S.
 1983. Quaternary Geology of the Bath-Yorkshire Island Area, Southern Ontario. Ontario Geological Survey, Map P. 2588, Geological Series-Preliminary Map, scale 1:50 000. Geology 1982.