

## THESE TERMS GOVERN YOUR USE OF THIS DOCUMENT

***Your use of this electronic information product (“EIP”), and the digital data files contained on it (the “Content”), is governed by the terms set out on this page (“Terms of Use”). By opening the EIP and viewing the Content, you (the “User”) have accepted, and have agreed to be bound by, the Terms of Use.***

**EIP and Content:** This EIP and Content is offered by the Province of Ontario’s *Ministry of Energy, Northern Development and Mines* (ENDM) as a public service, on an “as-is” basis. Recommendations and statements of opinions expressed 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 EIP and its 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. ENDM does not guarantee, or make any warranty express or implied, that the Content is current, accurate, complete or reliable or that the EIP is free from viruses or other harmful components. ENDM is not responsible for any damage however caused, which results, directly or indirectly, from your use of the EIP or the Content. ENDM assumes no legal liability or responsibility for the EIP or the Content whatsoever.

**Links to Other Web Sites:** This EIP or the Content may contain links, to Web sites that are not operated by ENDM. Linked Web sites may not be available in French. ENDM 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:

Handley, L.A. and Dyer, R.D. 2018. McFaulds Lake (“Ring of Fire”) area lake sediment and water geochemistry, northern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 373.

**Use and Reproduction of Content:** The EIP and 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 ENDM. 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 the EIP or Content	ENDM Publication Services	Local: (705) 670-5691 Toll-Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	<a href="mailto:Pubsales.ndm@ontario.ca">Pubsales.ndm@ontario.ca</a>
The Purchase of ENDM Publications	ENDM Publication Sales	Local: (705) 670-5691 Toll-Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	<a href="mailto:Pubsales.ndm@ontario.ca">Pubsales.ndm@ontario.ca</a>
Crown Copyright	Queen’s Printer	Local: (416) 326-2678 Toll-Free: 1-800-668-9938 (inside Canada, United States)	<a href="mailto:Copyright@ontario.ca">Copyright@ontario.ca</a>

For information on purchasing all publications, including digital data, contact:

Publication Sales

Ministry of Energy, Northern Development and Mines

933 Ramsey Lake Rd., Level A3

Sudbury, Ontario P3E 6B5

Tel: 1-888-415-9845, ext. 5691 (toll-free inside Canada and the United States)

Tel: (705) 670-5691 (local calls)

Fax: (705) 670-5770

---

Users of OGS products are encouraged to contact those Aboriginal communities whose traditional territories may be located in the mineral exploration area to discuss their project.

---

Miscellaneous Release—Data 373

**McFaulds Lake (“Ring of Fire”) Area Lake Sediment and Water Geochemistry, Northern Ontario**

by L.A. Handley and R.D. Dyer

This publication can be downloaded from

[http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm\\_dir.asp?type=pub&id=MRD373](http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD373)

This digital data release provides deep and shallow lake sediment geochemical data and lake water geochemical data, including quality control data, collected from a total of 1323 sites in the McFaulds Lake area in northern Ontario, during the summers of 2011, 2012 and 2013. The survey covers an area of approximately 9400 km<sup>2</sup> corresponding to an average sampling density of 1 sample site per 7.1 km<sup>2</sup>. The sediment samples were analyzed for loss on ignition (LOI); and by inductively coupled plasma optical emission spectrometry (ICP–OES), inductively coupled plasma mass spectrometry (ICP–MS); and by instrumental neutron activation analysis (INAA, for deep sediments only). Lake water samples were analyzed by ICP–OES, ICP–MS and ion chromatography (IC). Quality control data consists of the results from the analysis of duplicate pairs and certified reference materials and are included in this release. The ICP–MS, ICP–OES, IC and LOI analyses were conducted by Geoscience Laboratories and INAA analysis was completed by Becquerel Laboratories. Lake water measurements of temperature, pH and conductivity were determined *in situ*. All location information is presented as Universal Transverse Mercator (UTM) co-ordinates using North American Datum 1983 (NAD83) in Zone 16. Data are available as 24 Microsoft® Excel® 2016 (.xlsx) files and are accompanied by supporting documentation in portable document format (.pdf).

## CONTENTS

This digital data release consists of deep and shallow lake sediment and water chemistry and related quality control data. Fieldwork in the survey area, centered on McFaulds Lake, was completed during the summers of 2011, 2012 and 2013 (*see* Dyer 2011, 2012 and Dyer and Handley 2013). The survey area covers most of the McFaulds Lake greenstone belt including the area of the known chromite and nickel-copper-platinum group elements (PGE) deposits. Sample coverage was complete over the areas represented by National Topographic System (NTS) map sheets 43 C/12; 43 D/9, 10, 15, 16 and 43 E/1, 2 as well as partial coverage over 43 C/11, 13; 43 D/6, 7, 8, 11, 14 and 43 E/3, 6, 7, 8. The survey covers an area of approximately 9400 km<sup>2</sup> corresponding to an average sampling density of 1 sample site per 7.1 km<sup>2</sup>. Results from this new three-year OGS McFaulds Lake survey provide updated high-resolution geochemical data for both mineral exploration and environmental baseline purposes.

Deep (greater than 15 cm sediment depth) and shallow (less than 15 cm sediment depth) lake sediment and water samples were collected from a total of 1323 sites visited over the three-year project. Sediment samples were dried at a temperature less than 40°C prior to pulverization and sieving through -60 mesh sieves. A subsample (0.5 g) of each prepared (-60 mesh) sediment pulp was digested in aqua regia prior to inductively coupled plasma optical emission spectrometry (ICP–OES) and inductively coupled plasma mass spectrometry (ICP–MS) analysis. Analysis of the deep lake sediments also included instrumental neutron activation analysis (INAA). Loss on ignition (LOI) analysis at 500°C was also performed on a subsample (1 g) of prepared sediment pulp material and reported. Water samples were filtered and preserved with nitric acid within 6 hrs of collection; laboratory analysis included ICP–OES, ICP–MS and ion chromatography (IC). Quality control data consisting of the results from the analysis of duplicate pairs and certified reference materials are included in this release. The ICP–MS, ICP–OES, IC and LOI analyses were conducted by Geoscience Laboratories and INAA analysis was completed by Becquerel Laboratories. All location information is presented as Universal Transverse Mercator (UTM) co-ordinates using North American Datum 1983 (NAD83) in Zone 16. The data are available as 24 Microsoft® Excel® 2016 (.xlsx) files.

The data are organized into 4 subfolders, as follows.

/data

Deep

Shallow

Tables

Water

**Deep folder.** This folder contains 5 Microsoft® Excel® 2016 (.xlsx) files, each containing information and data pertaining to deep lake sediment samples.

*MRD373\_Deep\_Sed\_ICP\_INAA\_Data.xlsx* provides sample site numbers, UTM co-ordinates (NAD83, Zone 16), lake depth, ICP–MS, ICP–OES and INAA analytical data and LOI.

*MRD373\_Deep\_Sed\_ICP\_QC\_CRMs.xlsx* provides geochemical data for certified lake sediment reference standard LKSD-1, LKSD-4 and OGS internal reference material RAFT-1 and DILL-1, as inserted into the deep lake sediment sample sequence. File contains ICP–MS and ICP–OES analytical data and LOI for deep lake sediment samples.

*MRD373\_Deep\_Sed\_ICP\_QC\_Dups.xlsx* provides geochemical data for deep lake sediment analytical pulp duplicate pairs. File contains ICP–MS and ICP–OES analytical data and LOI.

*MRD373\_Deep\_Sed\_INAA\_QC\_CRMs.xlsx* provides geochemical data for certified lake sediment reference standard LKSD-1 and LKSD-4 and OGS internal reference material RAFT-1 and DILL-1, as inserted into the deep lake sediment sample sequence. File contains INAA analytical data for deep lake sediment samples.

*MRD373\_Deep\_Sed\_INAA\_QC\_Dups.xlsx* provides geochemical data for deep lake sediment analytical pulp duplicate pairs. File contains INAA analytical data.

**Shallow Folder.** This folder contains 3 Microsoft® Excel® 2016 (.xlsx) files, each containing information and data pertaining to shallow lake sediment samples.

*MRD373\_Shallow\_Sed\_ICP\_Data.xlsx* provides sample site numbers, UTM coordinates (NAD83, Zone 16), lake depth, ICP-MS and ICP-OES analytical data and LOI.

*MRD373\_Shallow\_Sed\_ICP\_QC\_CRMs.xlsx* provides geochemical data for certified lake sediment reference standard LKSD-4 and OGS internal reference material RAFT-1, as inserted into the shallow lake sediment sample sequence. File contains ICP-MS and ICP-OES analytical data and LOI for shallow lake sediment samples.

*MRD373\_Shallow\_Sed\_ICP\_QC\_Dups.xlsx* provides geochemical data for shallow lake sediment analytical pulp duplicate pairs. File contains ICP-MS and ICP-OES analytical data and LOI.

**Tables Folder.** This folder contains 9 Microsoft® Excel® 2016 (.xlsx) files containing summary information tables including estimates of precision.

*MRD373\_2011\_Table\_1.xlsx* provides a summary of elements analyzed in deep lake sediment samples in 2011. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2011\_Table\_2.xlsx* provides a summary of elements analyzed in shallow lake sediment samples in 2011. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2011\_Table\_3.xlsx* provides a summary of elements analyzed in lake water samples in 2011. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2012\_Table\_1.xlsx* provides a summary of elements analyzed in deep lake sediment samples in 2012. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2012\_Table\_2.xlsx* provides a summary of elements analyzed in shallow lake sediment samples in 2012. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2012\_Table\_3.xlsx* provides a summary of elements analyzed in lake water samples in 2012. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2013\_Table\_1.xlsx* provides a summary of elements analyzed in deep lake sediment samples in 2013. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2013\_Table\_2.xlsx* provides a summary of elements analyzed in shallow lake sediment samples in 2013. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD373\_2013\_Table\_3.xlsx* provides a summary of elements analyzed in lake water samples in 2013. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

**Water Folder.** This folder contains 7 Microsoft® Excel® 2016 (.xlsx) files, each containing information and data pertaining to lake water samples.

*MRD373\_Lake\_Water\_IC\_QC\_Blanks.xlsx* provides geochemical data for distilled water blanks and filtered distilled water blanks inserted into the lake water sample sequence. File contains IC analytical data.

*MRD373\_Lake\_Water\_IC\_QC\_Dups.xlsx* provides geochemical data for lake water analytical duplicate pairs. File contains IC analytical data.

*MRD373\_Lake\_Water\_ICP\_IC\_Data.xlsx* provides sample site numbers, UTM co-ordinates (NAD83, Zone 16), lake depth, ICP-MS, ICP-OES and IC analytical data.

*MRD373\_Lake\_Water\_ICP\_QC\_Blanks.xlsx* provides geochemical data for distilled water blanks and filtered distilled water blanks inserted into the lake water sample sequence. File contains ICP-MS and ICP-OES analytical data.

*MRD373\_Lake\_Water\_ICP\_QC\_CRMs.xlsx* provides geochemical data for lake water reference material SLRS-5, as inserted into the lake water sample sequence. File contains ICP-MS and ICP-OES analytical data.

*MRD373\_Lake\_Water\_ICP\_QC\_Dups.xlsx* provides geochemical data for lake water analytical duplicate pairs. File contains ICP-MS and ICP-OES analytical data.

*MRD373\_Lake\_Water\_YSI\_Data.xlsx* provides lake water limnological data collected using a YSI multi-parameter water-quality probe. This file includes sample site numbers, UTM co-ordinates (NAD83, Zone 16), water temperature, pH and electrical conductivity.

## References

- Dyer, R.D. 2011. McFaulds Lake Area Lake Sediment and Water Pilot Study, northern Ontario; *in* Summary of Field Work and Other Activities 2011, Ontario Geological Survey, Open File Report 6270, p.25-1 to 25-6.
- 2012. McFaulds Lake (“Ring of Fire”) area lake sediment and water sampling pilot study, Far North Ontario; *in* Summary of Field Work and Other Activities 2012, Ontario Geological Survey, Open File Report 6280, p.28-1 to 28-5.
- Dyer, R.D. and Handley, L.A. 2013. McFaulds Lake (“Ring of Fire”) Area High Density Lake Sediment and Water Survey, Far North Ontario; *in* Summary of Field Work and Other Activities 2013, Ontario Geological Survey, Open File Report 6290, p.32-1 to 32-17.
- Hornbrook, E.H.W., Coker, W.B. and Lynch, J.J. 1978a. National geochemical reconnaissance release NGR 18-1977, regional lake sediment and water geochemical reconnaissance data, Ontario–north shore Lake Superior; Geological Survey of Canada, Open File 507.
- 1978b. National geochemical reconnaissance release NGR 17-1977, regional lake sediment and water geochemical reconnaissance data, Ontario–north shore Lake Superior; Geological Survey of Canada, Open File 506, 275p.
- Hornbrook, E.H.W., Friske, P.W.B., Lynch, J.J., McCurdy, M.W., Gross, H., Galletta, A.C. and Durham, C.C. 1990. National geochemical reconnaissance lake sediment and water data, central northern Ontario (parts of NTS 42E, 42L and 52H); Geological Survey of Canada, Open File 2177.