

## 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 Northern Development and Mines* (MNDM) 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. MNDM 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. MNDM is not responsible for any damage however caused, which results, directly or indirectly, from your use of the EIP or the Content. MNDM 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 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:

Handley, L.A. and Dyer, R.D. 2018. Lake sediment and water geochemical data from the Greenstone area, northwestern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 358.

**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 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 the EIP or Content	MNDM 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 MNDM Publications	MNDM 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 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 358

**Lake Sediment and Water Geochemical Data from the Greenstone Area, Northwestern 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=MRD358](http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD358)

This digital data release provides deep and shallow lake sediment geochemical data and lake water geochemical data, including quality control data, for samples collected from a total of 2229 sites in the Greenstone area in northwestern Ontario, during the 2011 and 2012 field seasons. Deep and shallow lake sediment were analyzed for loss on ignition (LOI); and by instrumental neutron activation analysis (INAA, for deep sediment only), inductively coupled plasma atomic emission spectroscopy (ICP–AES) and inductively coupled plasma mass spectrometry (ICP–MS) for more than 50 elements. Lake water samples were analyzed for more than 50 elements by inductively coupled plasma atomic emission spectroscopy (ICP–AES), inductively coupled plasma mass spectrometry (ICP–MS) and ion chromatography (IC). Temperature, pH and conductivity were determined in the field. 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 22 Microsoft® Excel® 2013 (.xlsx) format files and are accompanied by supporting documentation in portable document format (.pdf).

Fieldwork in the survey area, located between the town of Longlac and Lake Nipigon, was completed during the summers of 2011 and 2012 (Dyer 2011; Dyer and Burke 2012). The survey area straddles the boundary between the Wabigoon and Quetico subprovinces of the Superior Province, and covers most of the Beardmore–Geraldton and Onaman–Tashota greenstone belts. Sampling was conducted over areas represented by National Topographic System (NTS) map sheets 42 E/10, 42 E/11, 42 E/13, 42 E/14, 42 E/15, 42 L/4 and a portion of 52 H/16. This study encompasses an area approximately 6170 km<sup>2</sup> corresponding to an average sample density of 1 sample site per 2.7 km<sup>2</sup>.

The Greenstone region was previously sampled at a much lower density during the late 1970s and early 1980s for the National Geochemical Reconnaissance (NGR) lake sediment program carried out jointly by the Geological Survey of Canada and the Ontario Geological Survey (Hornbrook, Coker and Lynch 1978a, 1978b; Hornbrook et al. 1990). The results from this survey provides updated high-resolution geochemical data for the Greenstone area that can be used for both mineral exploration and environmental baseline purposes.

Deep and shallow lake sediment and water samples were collected from a total of 2229 sites over the two-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 spectroscopy (ICP–OES) and inductively coupled plasma mass spectroscopy (ICP–MS) analysis. Analysis of the deep lake sediments also included instrumental neutron activation analysis (INAA). Loss on ignition (LOI) 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 hours 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 water samples were sent to the Geoscience (Geo Labs) Laboratories for ICP–MS, ICP–OES, IC and LOI analyses and INAA analysis was completed externally by Becquerel Laboratories.

## CONTENTS

The data are organized into 4 folders, as follows:

1. Deep
2. Shallow
3. Tables
4. Water

## FILE DESCRIPTION

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

*MRD358\_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.

*MRD358\_Deep\_Sed\_ICP\_QC\_CRMs.xlsx* provides geochemical data for certified lake sediment reference standard LKSD-1 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.

*MRD358\_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.

*MRD358\_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 DILL-1 and RAFT-1, as inserted into the deep lake sediment sample sequence. File contains INAA analytical data for deep lake sediment samples.

*MRD358\_Deep\_Sed\_INAA\_QC\_Dups.xlsx* provides geochemical data for deep lake sediment analytical pulp duplicate pairs. File contains INAA analytical data.

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

*MRD358\_Shallow\_Sed\_ICP\_Data.xlsx* provides sample site numbers, UTM co-ordinates (NAD83, Zone 16), lake depth, ICP–MS and ICP–OES analytical data and LOI.

*MRD358\_Shallow\_Sed\_ICP\_QC\_CRMs.xlsx* provides geochemical data for certified lake sediment reference standard LKSD-1 and LKSD-4, 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.

*MRD358\_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.

**3. Tables** This folder contains 6 Microsoft® Excel® (.xlsx) files containing summary information tables including estimates of precision.

*MRD358\_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.

*MRD358\_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.

*MRD358\_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.

*MRD358\_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.

*MRD358\_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.

*MRD358\_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.

**4. Water** This folder contains 8 Microsoft® Excel® (.xlsx) files, each containing information and data pertaining to lake water samples.

*MRD358\_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.

*MRD358\_Lake\_Water\_IC\_QC\_CRMs.xlsx* provides geochemical data for lake water reference material SLRS-4 and SLRS-5, as inserted into the lake water sample sequence. File contains IC analytical data.

*MRD358\_Lake\_Water\_IC\_QC\_Dups.xlsx* provides geochemical data for lake water analytical duplicate pairs. File contains IC analytical data.

*MRD358\_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.

*MRD358\_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.

*MRD358\_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.

*MRD358\_Lake\_Water\_ICP\_QC\_Dups.xlsx* provides geochemical data for lake water analytical duplicate pairs. File contains ICP–MS and ICP–OES analytical data.

*MRD358\_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. Greenstone area high-density lake sediment and water survey, northwestern Ontario; *in* Summary of Field Work and Other Activities 2011, Ontario Geological Survey, Open File Report 6270, p.24-1 to 24-5.
- Dyer, R.D. and Burke, H.E. 2012. Greenstone area high-density lake sediment and water survey, northwestern Ontario; *in* Summary of Field Work and Other Activities 2012, Ontario Geological Survey, Open File Report 6280, p.26-1 to 26-5.
- 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.