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Miscellaneous Release—Data 364

**Lake Sediment and Water Geochemical Data from the Nakina–Marshall Lake 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=MRD364](http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD364)

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 1638 sites. The survey was conducted during the summers of 2014 and 2015 in the area between Nakina and Marshall Lake in northwestern Ontario. 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 optical emission spectroscopy (ICP–OES) and inductively coupled plasma mass spectrometry (ICP–MS). Lake water samples were analyzed by inductively coupled plasma optical emission spectroscopy (ICP–OES), inductively coupled plasma mass spectrometry (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 completed by Geoscience Laboratories and INAA analysis 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 21 Microsoft® Excel® 2013 (.xlsx) format files.

## CONTENTS

The digital data consists of deep and shallow lake sediment and water chemistry and related quality control data. Fieldwork in the survey area, located between the town of Nakina and Marshall Lake, was completed during the summers of 2014 and 2015 (*see* Dyer and Handley 2014; Dell, Dyer and Handley 2015). The survey area is underlain by Archean rocks of the Wabigoon Subprovince of the Superior Province, and covers most of the Onaman–Tashota and Marshall Lake greenstone belts. Sample coverage was complete over the areas represented by National Topographic System (NTS) map sheets 42 L/2, 3, 5 and 6. The survey covers an area approximately 4000 km<sup>2</sup> corresponding to an average sample density of 1 sample site per 2.5 km<sup>2</sup>.

Approximately 75% of the Nakina survey area 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 current Nakina–Marshall Lake survey provides updated high-resolution geochemical data for both mineral exploration and environmental baseline purposes.

Deep and shallow lake sediment and water samples were collected from a total of 1638 sites visited over the two-year project. Sediment samples were dried at a temperature less than 40° C prior to pulverization and sorted through -60 mesh sieves. A sub-sample (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 sub-sample (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 ICP–MS, ICP–OES, IC and LOI analyses were completed by Geoscience Laboratories and INAA was completed by Becquerel Laboratories.

The data are organized into 4 folders, as follows.

- /data
  - Deep
  - Shallow
  - Tables
  - Water

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

*MRD364\_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.

*MRD364\_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-2, 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.

*MRD364\_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.

*MRD364\_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-2, as inserted into the deep lake sediment sample sequence. File contains INAA analytical data for deep lake sediment samples.

*MRD364\_Deep\_Sed\_INAA\_QC\_Dups.xlsx* provides geochemical data for deep lake sediment analytical pulp duplicate pairs. File contains INAA analytical data.

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

*MRD364\_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.

*MRD364\_Shallow\_Sed\_ICP\_QC\_CRMs.xlsx* provides geochemical data for certified lake sediment reference standard LKSD-1 and LKSD-4 and OGS internal reference material RAFT-2, 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.

*MRD364\_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** This folder contains 6 Microsoft® Excel® (.xlsx) files containing summary information tables including estimates of precision.

*MRD364\_2014\_Table\_1.xlsx* provides a summary of elements analyzed in deep lake sediment samples in 2014. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD364\_2014\_Table\_2.xlsx* provides a summary of elements analyzed in shallow lake sediment samples in 2014. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD364\_2014\_Table\_3.xlsx* provides a summary of elements analyzed in lake water samples in 2014. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD364\_2015\_Table\_1.xlsx* provides a summary of elements analyzed in deep lake sediment samples in 2015. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD364\_2015\_Table\_2.xlsx* provides a summary of elements analyzed in shallow lake sediment samples in 2015. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

*MRD364\_2015\_Table\_3.xlsx* provides a summary of elements analyzed in lake water samples in 2015. Table contains basic statistics, quality control data and estimates of precision for each metal, based on the results of the duplicate pairs.

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

*MRD364\_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.

*MRD364\_Lake\_Water\_IC\_QC\_Dups.xlsx* provides geochemical data for lake water analytical duplicate pairs. File contains IC analytical data.

*MRD364\_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.

*MRD364\_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.

*MRD364\_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.

*MRD364\_Lake\_Water\_ICP\_QC\_Dups.xlsx* provides geochemical data for lake water analytical duplicate pairs. File contains ICP-MS and ICP-OES analytical data.

*MRD364\_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. and Handley, L.A. 2014. Nakina–Marshall Lake area high-density lake sediment and water geochemical survey, northwestern Ontario; *in* Summary of Field Work and Other Activities 2014, Ontario Geological Survey, Open File Report 6300, p.27-1 to 27-5.
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- 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.
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