# LKSD-1 to LKSD-4

## Lake Sediment Samples

LKSD-1 to LKSD-4 were chosen to represent typical lake sediments from various locations within the Canadian Shield. Efforts were made to incorporate a range of concentrations for a substantial number of elements. Collection was carried out by the Geological Survey of Canada using various dredges and sampling devices both in winter and summer and normally from the centre lake bottom. The samples were prepared, blended and bottled at CANMET. Information on each sample follows. The National Topographic System (NTS) for identifying maps in Canada is used.

**LKSD-1:** This sample is a mixture of lots from Joe Lake (31F) and Brady Lake (31M) in Ontario.

**LKSD-2:** This sample is a mixture of a lot from Calabogie Lake (31F) in Ontario and a composite from 86K and 86L in the North West Territories. Composites were produced by mixing unused portions of regional survey samples collected in the corresponding NTS sheets.

**LKSD-3:** This sample is a mixture of a lot from Calabogie Lake (31F) in Ontario, a composite from 64L and 64M in Manitoba, and a composite from 31M, 31N, 32C, 32D, 41P, and 42A in Ontario.

**LKSD-4:** This sample is a composite from Big Gull Lake (31C) in Ontario and Key and Sea Horse Lakes (74H) in Saskatchewan.

Thirty-five laboratories provided analytical data and provisionally Certified Values are given for 65 elements. Besides "total" values, the samples were also characterized for values' relating to specific types of partial extraction's wherein the sample is not totally dissolved, particularly the silicate components.

A publication giving complete details on these lake sediment reference materials will be forwarded with each order.

**Provisional Values for Major and Minor ElementsExpressed as Per Cent Oxides**

| Constituent | LKSD 1 | LKSD 2 | LKSD 3 | LKSD 4 |
|---|---|---|---|---|
| $SiO_2$ | 40.1 | 58.9 | 58.5 | 41.6 |
| $Al_2O_3$ | 7.8 | 12.3 | 12.5 | 5.9 |
| $Fe_2O_3$ | 4.1 | 6.2 | 5.7 | 4.1 |
| MgO | 1.7 | 1.7 | 2.0 | 0.9 |

| | | | | |
|---|---|---|---|---|
| CaO | 10.8 | 2.2 | 2.3 | 1.8 |
| $Na_2O$ | 2.0 | 1.9 | 2.3 | 0.7 |
| $K_2O$ | 1.1 | 2.6 | 2.2 | 0.8 |
| MnO | 0.1 | 0.3 | 0.2 | 0.1 |
| $TiO_2$ | 0.5 | 0.6 | 0.5 | 0.4 |
| $P_2O_5$ | 0.2 | 0.3 | 0.2 | 0.3 |
| LOI (1000°C) | 29.9 | 13.6 | 13.4 | 43.6 |
| SO4* | 1.6 | - | - | - |
| Sum | 99.9 | 100.6 | 99.8 | 100.2 |

* One laboratory only

Lake Sediments LKSD-1 to LKSD-4
Provisional Values for "Total" Elements µg/g(except where noted)

| Constituent | LKSD 1 | LKSD 2 | LKSD 3 | LKSD 4 |
|---|---|---|---|---|
| Ag | 0.6 | 0.8 | 2.7 | <0.5 |
| As | 40 | 11 | 27 | 16 |
| Au (ng/g) | 5 | 3 | 3 | 2 |
| B | 49 | 65 | 25 | 22 |
| Ba | 430 | 780 | 680 | 330 |
| Be | 1.1 | 2.5 | 1.9 | 1.0 |
| Br | 11 | 18 | 16 | 49 |
| C (%) | 12.3 | 4.5 | 4.5 | 17.7 |
| Ce | 27 | 108 | 90 | 48 |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Co | 11 | 17 | 30 | 11 |
| Cr | 31 | 57 | 87 | 33 |
| Cs | 1.5 | 3.0 | 2.3 | 1.7 |
| Cu | 44 | 37 | 35 | 31 |
| Dy | 3.4 | 7.3 | 4.9 | 3.7 |
| Eu | 0.9 | 1.9 | 1.5 | 1.1 |
| F | 300 | 590 | 490 | 260 |
| Fe (%) | 2.8 | 4.3 | 4.0 | 2.8 |
| $H_2O$ (%) | 2.92 | 2.23 | 2.07 | 6.55 |
| Hf | 3.6 | 7.0 | 4.8 | 2.8 |
| La | 16 | 68 | 52 | 26 |
| Li | 7 | 20 | 25 | 12 |
| LOI (500°C) (%) | 23.5 | 12.3 | 11.8 | 40.8 |
| Lu | 0.4 | 0.6 | 0.4 | 0.5 |
| Mn | 700 | 2020 | 1440 | 500 |
| Mo | 10 | <5 | <5 | <5 |
| Nb | 7 | 8 | 8 | 9 |
| Nd | 16 | 58 | 44 | 25 |
| Ni | 16 | 26 | 47 | 31 |
| Pb | 82 | 44 | 29 | 91 |
| Rb | 24 | 85 | 78 | 28 |
| S (%) | 1.57 | 0.14 | 0.14 | 0.99 |
| Sb | 1.2 | 1.1 | 1.3 | 1.7 |
| Sc | 9 | 13 | 13 | 7 |

| | | | | |
|---|---|---|---|---|
| Sm | 4 | 11 | 8 | 5 |
| Sn | 16 | 5 | 3 | 5 |
| Sr | 250 | 220 | 240 | 110 |
| Ta | 0.3 | 0.8 | 0.7 | 0.4 |
| Tb | 0.6 | 1.4 | 1.0 | 1.2 |
| Th | 2.2 | 13.4 | 11.4 | 5.1 |
| Ti | 3010 | 3460 | 3330 | 2270 |
| U | 9.7 | 7.6 | 4.6 | 31.0 |
| V | 50 | 77 | 82 | 49 |
| W | < 4 | < 4 | < 4 | < 4 |
| Y | 19 | 44 | 30 | 23 |
| Yb | 2.0 | 4.0 | 2.7 | 2.0 |
| Zn | 331 | 209 | 152 | 194 |
| Zr | 134 | 254 | 178 | 105 |

**Provisional Values for Partial Extraction Elements**
**Concentrated HNO3 - Concentrated HCl - µg/g(except where noted)**

| Constituent | LKSD 1 | LKSD 2 | LKSD 3 | LKSD 4 |
|---|---|---|---|---|
| Ag | 0.60 | 0.82 | 0.40 | 0.2 |
| As | 30 | 9 | 23 | 12 |
| Cd | 1.2 | 0.8 | 0.6 | 1.9 |
| Co | 9 | 17 | 30 | 11 |
| Cr | 12 | 29 | 51 | 21 |
| Cu | 44 | 36 | 34 | 30 |
| Fe (%) | 1.8 | 3.5 | 3.5 | 2.7 |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Hg (ng/g) | 110 | 160 | 290 | 190 |
| Mn | 460 | 1840 | 1220 | 430 |
| Mo | 12 | 2 | 2 | 2 |
| Ni | 11 | 23 | 44 | 32 |
| Pb | 84 | 40 | 26 | 93 |
| Sb | 1.2 | 1.2 | 1.4 | 1.5 |
| V | 27 | 48 | 55 | 32 |
| Zn | 337 | 200 | 139 | 189 |

## Provisional Values for Partial Extraction Elements

**Dilute HNO3 - Dilute HCl - µg/g(except where noted)**

| Constituent | LKSD 1 | LKSD 2 | LKSD 3 | LKSD 4 |
|---|---|---|---|---|
| Ag | 0.6 | 0.8 | 2.8 | 0.2 |
| Cd | 1.2 | 0.6 | 0.4 | 1.9 |
| Co | 8 | 16 | 30 | 9 |
| Cu | 44 | 36 | 34 | 31 |
| Fe (%) | 1.8 | 3.7 | 3.6 | 2.6 |
| Mn | 410 | 1840 | 1300 | 420 |
| Ni | 12 | 23 | 46 | 31 |
| Pb | 83 | 34 | 21 | 91 |
| Zn | 335 | 205 | 151 | 195 |

**CCRMP, CANMET Mining and Mineral Sciences Laboratories**
555 Booth Street, Ottawa
Ontario, Canada K1A 0G1

**Telephone: (613) 995-4738, Facsimile: (613) 943-0573.**
**E-mail: ccrmp@nrcan.gc.ca**