

spring 2008

update

Sudbury Soils Study
metals • health • environment



Human Health Risk Assessment Results

Public Release Dates Announced

After four years of intensive fieldwork and data analysis, the Sudbury Area Risk Assessment (SARA) Group is preparing to share the results of the Human Health Risk Assessment (HHRA) in May, 2008.

The final report, which represents Volume 2 of the Sudbury Soils Study, was provided to the Technical Committee (TC) in February. Prior to public release, the document underwent a comprehensive review by the Ontario Ministry of the Environment, the Sudbury & District Health Unit, and other TC members.

■ Mark your calendar!

The results of the health risk assessment will be presented at three Community Information Sessions, and all members of the public are invited to attend.

HHRA RESULTS – COMMUNITY INFORMATION SESSIONS

Date	Time	Location
Tuesday, May 13, 2008	3:00 pm to 8:00 pm	Science North 100 Ramsey Lake Rd., Sudbury
Wednesday, May 14, 2008	3:00 pm to 8:00 pm	Italian Club 7 Craig St., Copper Cliff
Thursday, May 15, 2008	3:00 pm to 8:00 pm	Recreation and Wellness Centre, 63 Edison, Falconbridge

The HHRA community information sessions will follow an open house format, with poster stations staffed by representatives from the study team and regulatory agencies overseeing the study. Experts from the fields of risk assessment, toxicology and human health will be available to discuss the study and answer questions.

During each information session, there will be three public briefings, which will include a presentation outlining the results, and opportunities for questions. The briefings are scheduled for 3:30 pm and 7:00 pm each day. The remaining time will allow the public to talk to the experts, one-on-one.

A Summary Report that will provide a plain language overview of the approach and findings of the HHRA will be available at the public briefings. Copies of this report will be available to members of the community.

A copy of the full technical report will also be available at the information sessions for reference. Additional copies will be made available for public review at local libraries and other information repositories.

Public Comments Welcome!

Between **May 19, 2008**, and **July 31, 2008**, members of the public are invited to submit written comments on the HHRA report to the SARA Group. Responses and comments will be summarized and provided in an appendix to the HHRA report.

Public comments will be accepted by mail, email and fax, and must be accompanied by your name and address. More information on the public comment period will be announced at the community information sessions and in the local media.

For more information, contact the SARA Group at 1-866-315-0228.

Filling the Data Gaps

HHRA Sampling and Analyses



As a result of the 2001 Soil Survey conducted by the Ontario Ministry of the Environment (MOE), the Sudbury Area Risk Assessment (SARA) Group had access to a large quantity of data for use in assessing risks to human health from metals in soil. From these data, six Chemicals of Concern (COC) were identified: arsenic, cobalt, copper, lead, nickel and selenium.

However, information was lacking for metal concentrations in other media such as local foods, drinking water and air. These data gaps needed to be filled for the Human Health Risk Assessment (HHRA) to make the most accurate risk predictions possible. In particular, the SARA Group recommended that more information was needed for levels of COC in the following:

- Home grown fruits and vegetables
- Indoor dust
- Outdoor air
- Wild blueberries and mushrooms
- Drinking water from private wells and local lakes
- Local wild fish



Extensive survey and sampling programs were undertaken during 2003–2005 to obtain as much area-specific information as possible to ensure that the health risk predictions would be as accurate as possible. Many Greater Sudbury citizens participated in these sampling programs by generously providing access to their homes and gardens. The following sections describe the sampling and survey programs that were carried out for the HHRA.

Vegetable Garden Survey

The vegetable garden survey was conducted from May through October 2003 to determine the range of COC levels found in locally grown fruits and vegetables. Produce and soil were sampled at 89 sites (64 residential, 15 commercial and 10 natural) in the study area. Items such as lettuce, carrots, tomatoes, blueberries and mushrooms were collected for analysis. The results of the vegetable garden survey were used along with the information from the food consumption survey to estimate exposure to COC from eating locally grown produce.

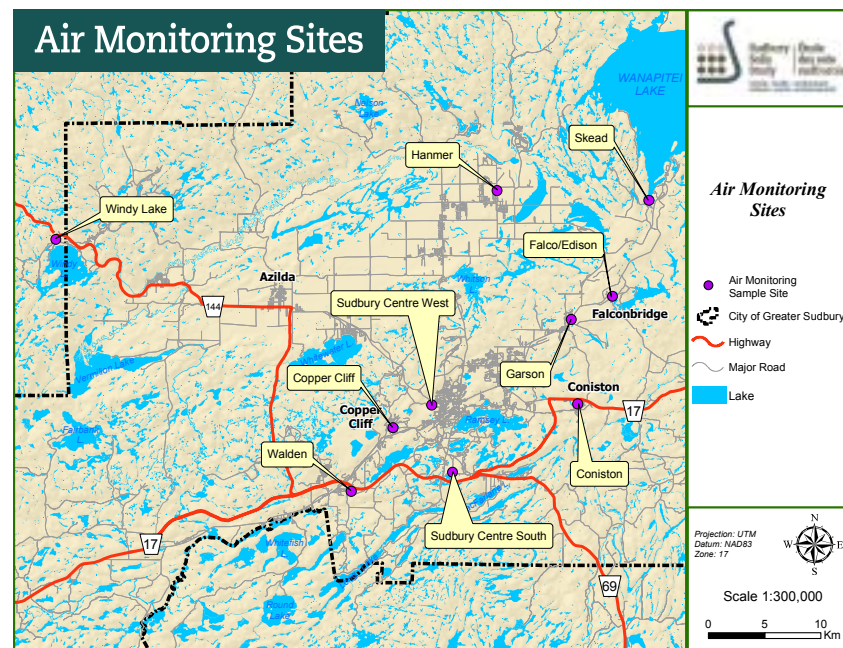
Indoor Dust Survey

The indoor dust survey measured levels of COC contained in indoor dust within the study area. Since indoor dust can be influenced by many potential sources of metals (household products, lead-based paint, etc.), soil samples were also taken from areas outside the buildings. The purpose of this was to see whether there was any relationship between levels of COC in indoor dust and levels detected in outdoor soil.

A total of 91 homes and eight schools were sampled. The results of the indoor dust survey were used in the HHRA to assess exposure to COC from ingestion and dermal (skin) contact with indoor dust.

Air Monitoring Program

Metals from smelters are generally attached to tiny dust particles that are transported in air currents. These particles must be analyzed to measure the levels of COC in air. A total of 1,200 air samples were collected from 10 locations within the study area over a one-year period (October 2003–September 2004). Particles were filtered from the air and samples were analyzed for a variety of metals, including the COC.



Food Consumption Survey

The Sudbury area food consumption survey was conducted to collect detailed information on the types and amounts of local foods consumed by area residents.

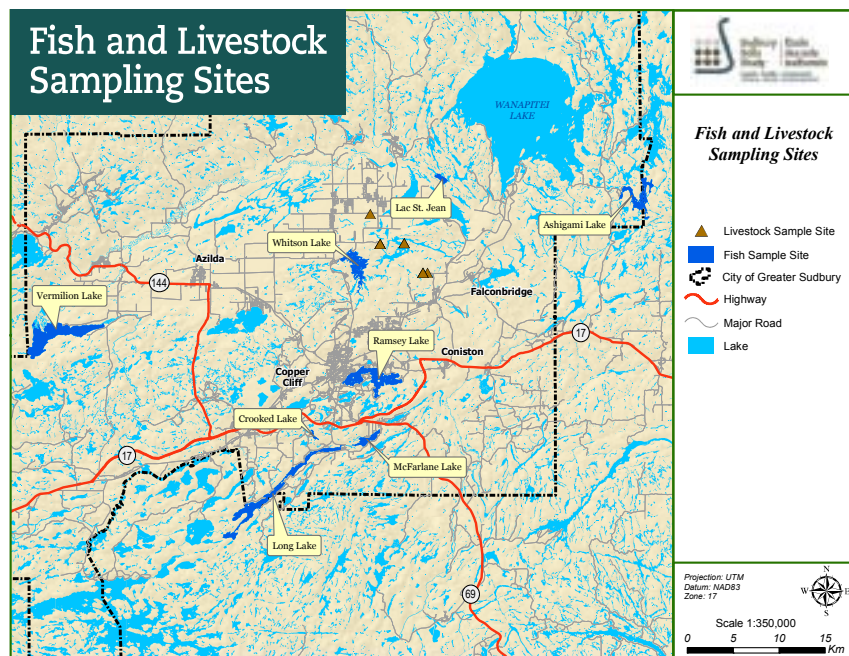
Information was collected through telephone and personal interviews of 497 households (a total of 1,444 individuals) in the study area. The results of this survey were used in combination with data from larger national surveys to determine how much of the total food consumption comes from local sources. This information was used in the HHRA to calculate potential exposures to COC from eating supermarket and locally produced food.

Drinking Water Survey

Most of the households in the Sudbury area receive their water from municipal water supplies that are regularly monitored for a variety of metals, including the COC, so exposures to COC from municipal water supplies could be estimated from existing data. However, levels of COC in private wells and surface water supplies were not known. In the fall of 2004, drinking water was sampled at 94 residences with private water supplies, including 76 well and 18 lake water sources.

Local Fish and Livestock Survey

Surveys were conducted to estimate the exposure of local residents to COC from consuming local fish and livestock. A total of 145 fish (perch and walleye) were collected from eight lakes within the study area. Samples were also collected from 10 beef cattle that were raised for private consumption.



Bioavailability Studies

The term "bioavailability" refers to the portion of the total amount of a chemical that is absorbed into an individual's bloodstream. The COC may be in a form that cannot be absorbed into the bloodstream. Therefore, actual exposures to COC are lower than the total amount of COC measured in soil and dust. Bioavailability of the COC was estimated using laboratory studies.

Speciation Studies

Metals are found in different chemical forms in the environment. Speciation is the process of determining which form is present. The chemical form of the metal can affect the bioavailability and relative toxicity of the metal. Speciation studies were also valuable tools for determining the sources of metals in the environment.

Falconbridge Arsenic Exposure Study

Although not part of the Sudbury Soils Study, an arsenic exposure study was conducted in fall 2004 to identify potential health impacts from elevated levels of arsenic in soil in the town of Falconbridge. More than 700 residents of Falconbridge and Hanmer (the comparison community) provided urine samples and information on lifestyle and behaviours that might affect arsenic exposure. The results of the urinary arsenic study showed that Falconbridge residents did not have higher urinary arsenic levels than residents in the comparison community and are not at any greater risk to arsenic-related health effects than the typical Canadian.

The numerous surveys, sampling programs and studies conducted for the Sudbury area HHRA provided a wealth of detailed area-specific information. Using this data in the HHRA significantly increases the accuracy of potential health risk predictions within the study area.

Identifying the Receptors: The Communities of Interest

In any Human Health Risk Assessment (HHRA), a "receptor" is defined as a person who lives, works, or visits within the study area and who may be exposed to the Chemicals of Concern (COC). Within the 40,000 square kilometre study area, the HHRA focused on receptors living in five Communities of Interest: Copper Cliff, Coniston, Falconbridge, Sudbury Centre and Hanmer.

The Technical Committee identified Copper Cliff, Coniston and Falconbridge as Communities of Interest because they are the locations of current and/or historic smelting activity. Sudbury Centre was chosen because it is the most concentrated residential region within the study area, and it is central to the three smelters. Hanmer was included for comparison purposes, because it is a local community that is not directly impacted by COC emissions from the smelters.

In addition to evaluating risks for residents within the five Communities of Interest, a Typical Ontario Resident was also evaluated for comparison purposes. In this case, available regulatory and scientific information was used to determine the level of risk that might exist for people living outside the study area. Several characteristics influence exposure, including body weight, breathing rate, food and drinking water consumption rate, and amount of time spent outdoors, among others. Since these factors vary depending on the life stage (age) of the receptor, five different life stages were considered in the Sudbury Area HHRA:

- Infant (0 to 6 months)
- Toddler (6 months to 5 years)
- Child (5 to 12 years)
- Adolescent (12 to 20 years)
- Adult (older than 20 years)

The female toddler was selected as the most "sensitive" receptor (the group with greatest potential for exposure to the COC). If potential health risks for the female toddler are found to be acceptable, then risks to other receptor groups are also acceptable.

Individuals living in the same area may also have different exposures to COC based on differences in their lifestyles and activities. For example, anglers, hunters and First Nations people tend to consume more local fish and game than other members of the community. If local fish and game contain higher levels of COC than those from outside the study area, these groups might be expected to experience higher COC exposures. To account for this possibility, risks to anglers, hunters and First Nations people living within each Community of Interest were assessed using higher rates of local fish and game intake.

The Chemicals of Concern (COC) being studied in the Sudbury Soils Study are arsenic, cobalt, copper, lead, nickel and selenium. More information on these metals is available at www.sudburysoilsstudy.com.

ERA Study Update

Assessing the Sudbury Environment



Dr. Christopher Wren

The Ecological Risk Assessment (ERA), which is the third and final volume of the Sudbury Soils Study, is now in the final stages of completion. In preparing the ERA, scientists examined potential impacts to plants and wildlife in the Sudbury area that may be related to mining practices.

In 2007, the draft ERA report underwent a comprehensive scientific peer review. Six North-American experts in the field of environmental science and toxicology were selected by a third-party consultant to conduct the review.

On March 5, 2007, a public briefing was held at Collège Boréal to meet the

members of the Independent Expert Review Panel (IERP). This was followed by two days of intensive meetings during which the panel interviewed members of the Sudbury Area Risk Assessment (SARA) Group, who are the principal authors of the study.

Immediately following their review, panel members concluded that the approaches used in the ERA were consistent with commonly accepted methods and sound scientific procedures. The panel also agreed that the ERA has achieved its two major goals:

- to characterize the current and future risks of metals to the terrestrial ecosystem; and
- to provide information to support activities related to the recovery of regionally representative, self-sustaining ecosystems in areas affected by the metals.

The panel issued a final summary of comments and recommendations on the ERA in June 2007. Since that time, the SARA Group has been addressing the comments of the IERP and other members of the Technical Committee that oversees the Sudbury Soils Study.

The SARA Group is currently revising the draft, and the final report will be submitted to the Technical Committee in 2008. Following a comprehensive review by the Ontario Ministry of the Environment and other members of the TC, the results of the ERA will be released to the public in 2008.

The results of the ERA will provide valuable information to help guide further greening efforts in and around the City of Greater Sudbury for many years to come.

Upcoming Events

HHRA Results Community Information Sessions

- **Tuesday, May 13, 2008**
3:00 pm to 8:00 pm
Science North (100 Ramsey Lake Rd., Sudbury)
- **Wednesday, May 14, 2008**
3:00 pm to 8:00 pm
Italian Club (7 Craig St., Copper Cliff)
- **Thursday, May 15, 2008**
3:00 pm to 8:00 pm
Recreation and Wellness Centre
(63 Edison, Falconbridge)



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Have your say

contact us

Here's how:

- Attend the public sessions at TC and PAC meetings
- Attend Community Information Sessions
- Call our toll-free project information number at 1.866.315.0228
- Send an email with your comments to: questions@sudburysoilsstudy.com
- Send written comments by mail or fax to:

The SARA Group
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512 Woolwich St., Suite 2
Guelph ON N1H 3X7
Fax: 519.763.1668

If you would like copies of previous newsletters, please contact us or visit www.sudburysoilsstudy.com

Further information and frequently asked questions can be found at the project website www.sudburysoilsstudy.com.

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