The Sudbury Soils Study
&
Risk Assessment

Sudbury Soils Study | Étude des sols sudburois
metals · health · environment
métaux · santé · environnement

Open House Presentation
November 25, 2003

SARA GROUP

Overview of Presentation

- Why are we here?
- What is the Sudbury Soils Study?
- What is Risk Assessment?
- What new studies are we doing?
- What can we expect?
- Where do we go from here?

Study Goal:

To make Sudbury a better place to live.

Mining activities in Sudbury have resulted in elevated metal levels in the soil

Copper Cliff Roast Yards, 1889 or 1890

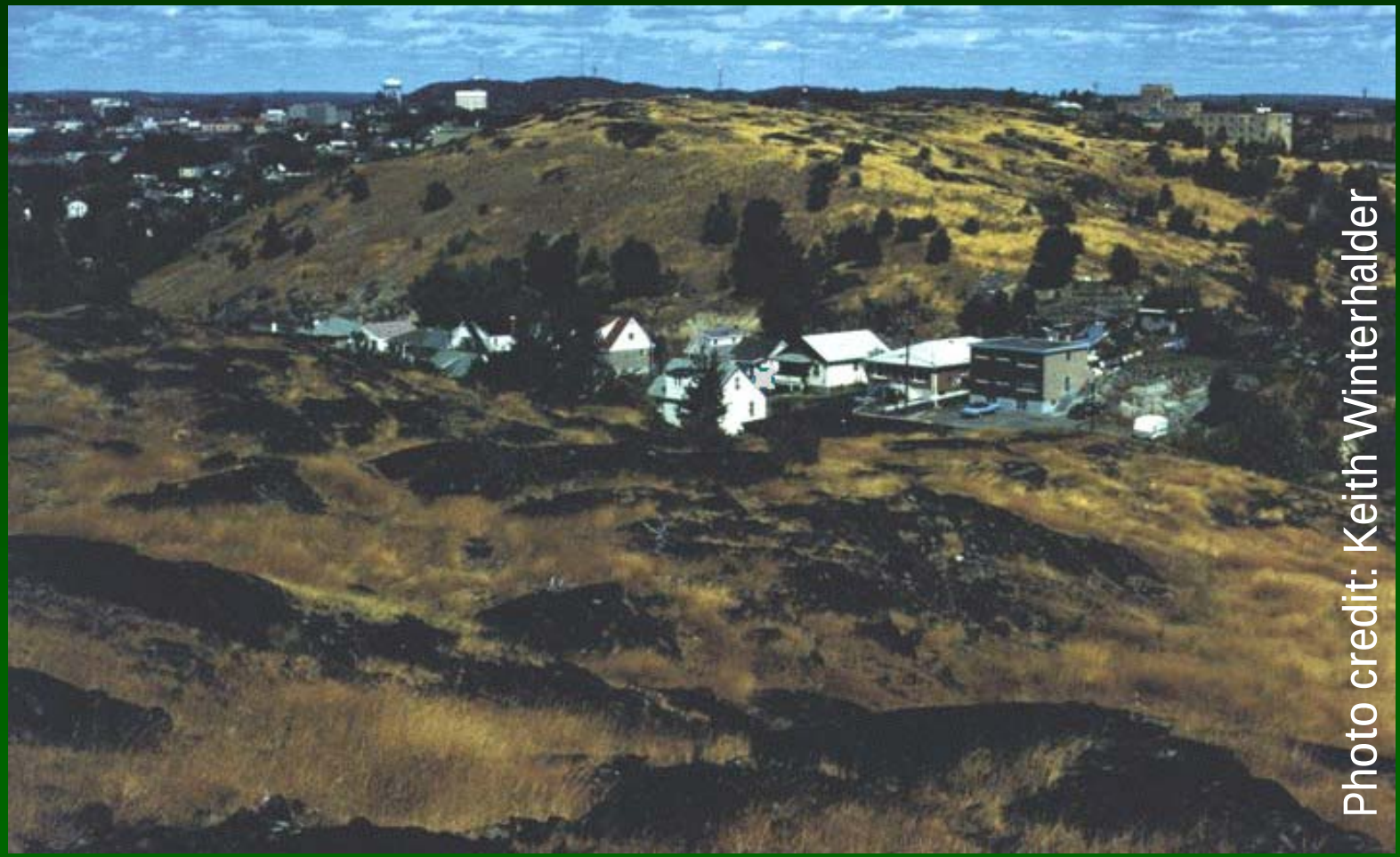
The Sudbury Soils Study will identify if the metal levels pose a risk to human health or the environment

Copper Cliff Mine as viewed through Copper Cliff Park - 1903

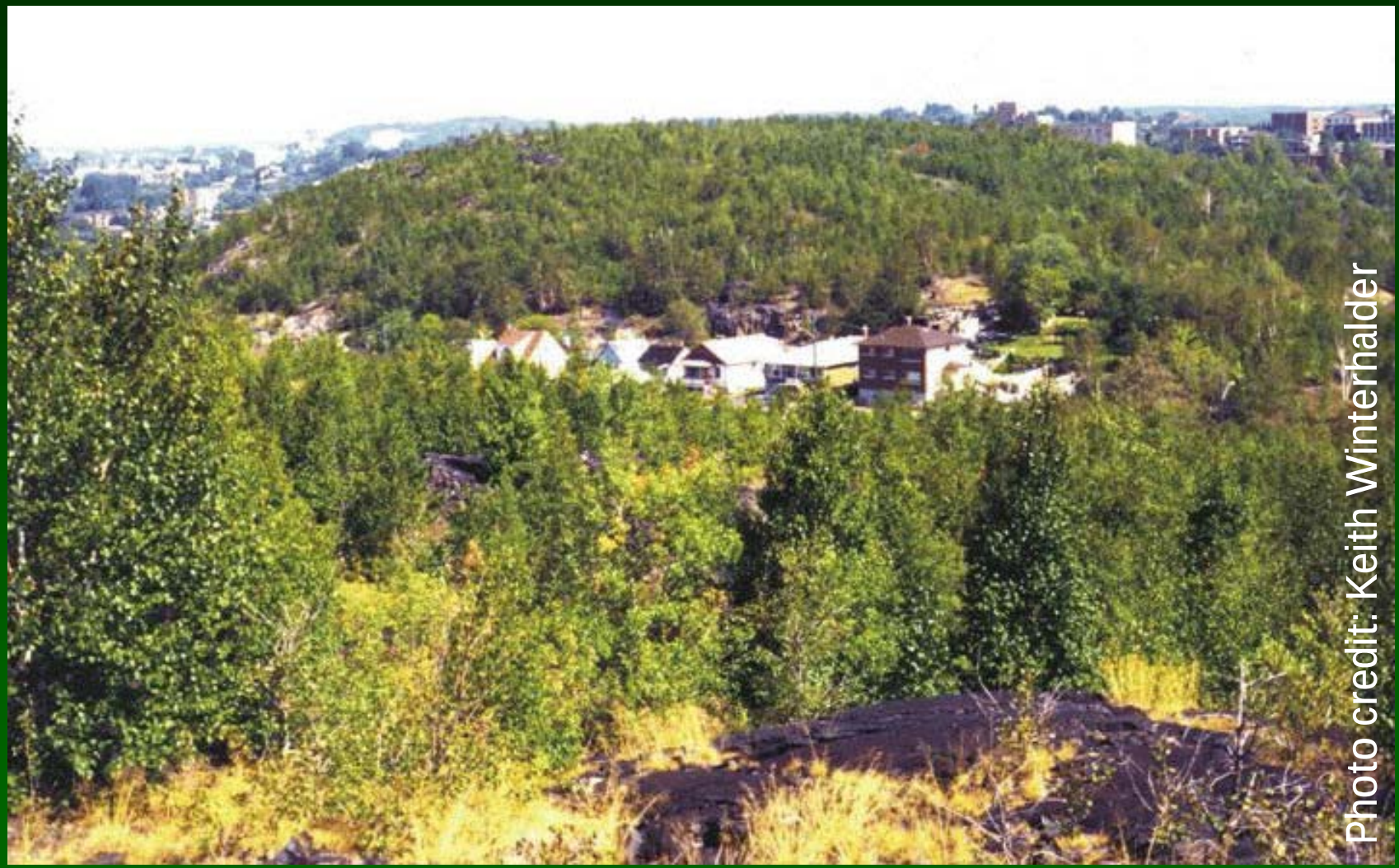
The Sudbury Soils Study builds on the local tradition of identifying environmental issues …

Martindale Road – late 1970's

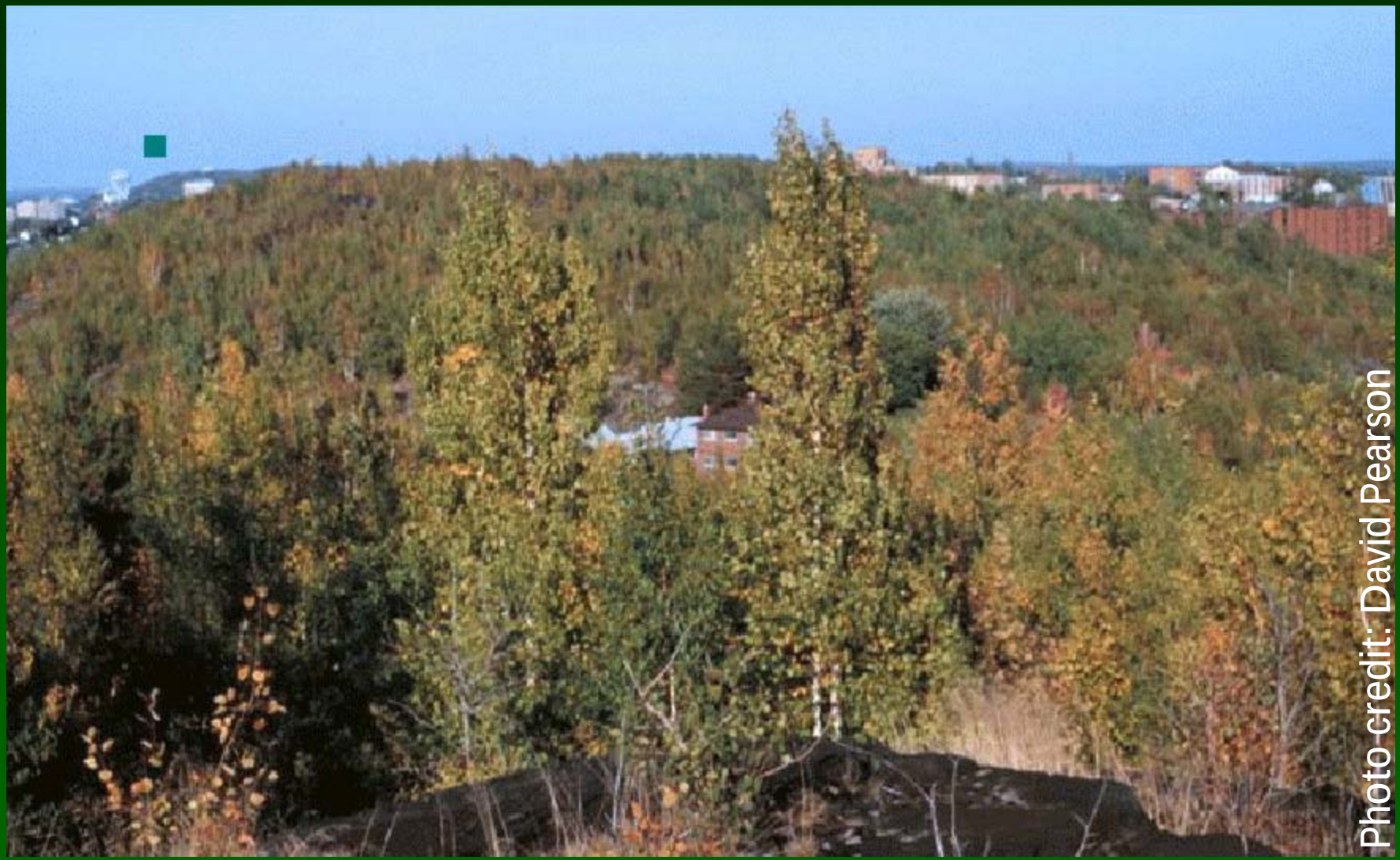
…and putting together a plan to address these issues.



Martindale Road – early 1980's



Martindale Road – early 1990’s



Martindale Road – 2001

The Last 30 years:

A Period of Growth & Change

1970’s

2001

Background to the Sudbury Soils Study

- In 2001, the Ontario Ministry of the Environment and Energy (MOE) released a report on the concentration of metals in Sudbury soils
- The report identified that concentrations of several metals in the Sudbury area exceeded the MOE generic soil quality guidelines

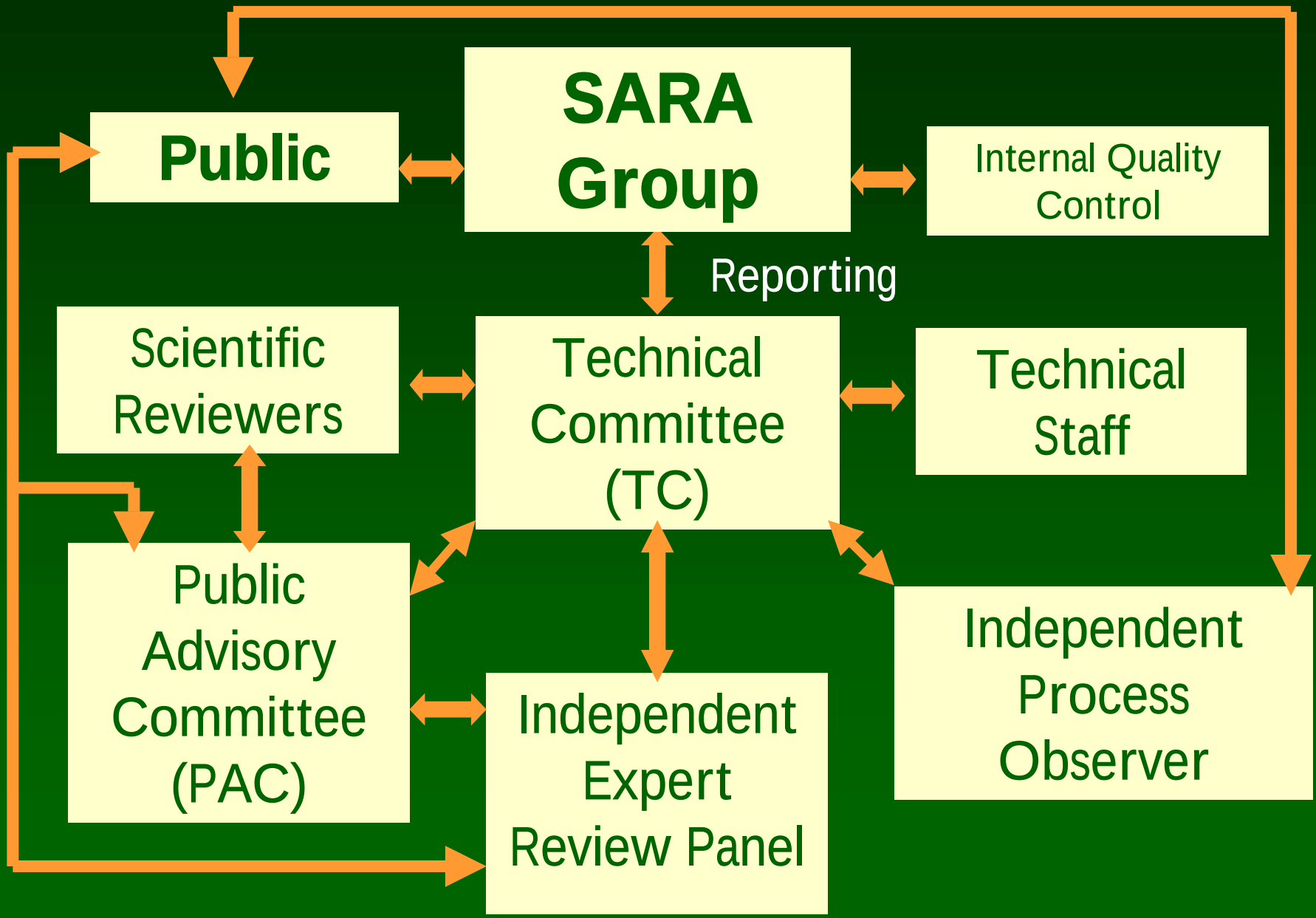
As a result, the MOE Recommended:

- That a significant soil collection and analysis program be conducted to fill data gaps. (Phase I)
- That a human health and ecological risk assessment be conducted (Phase II)

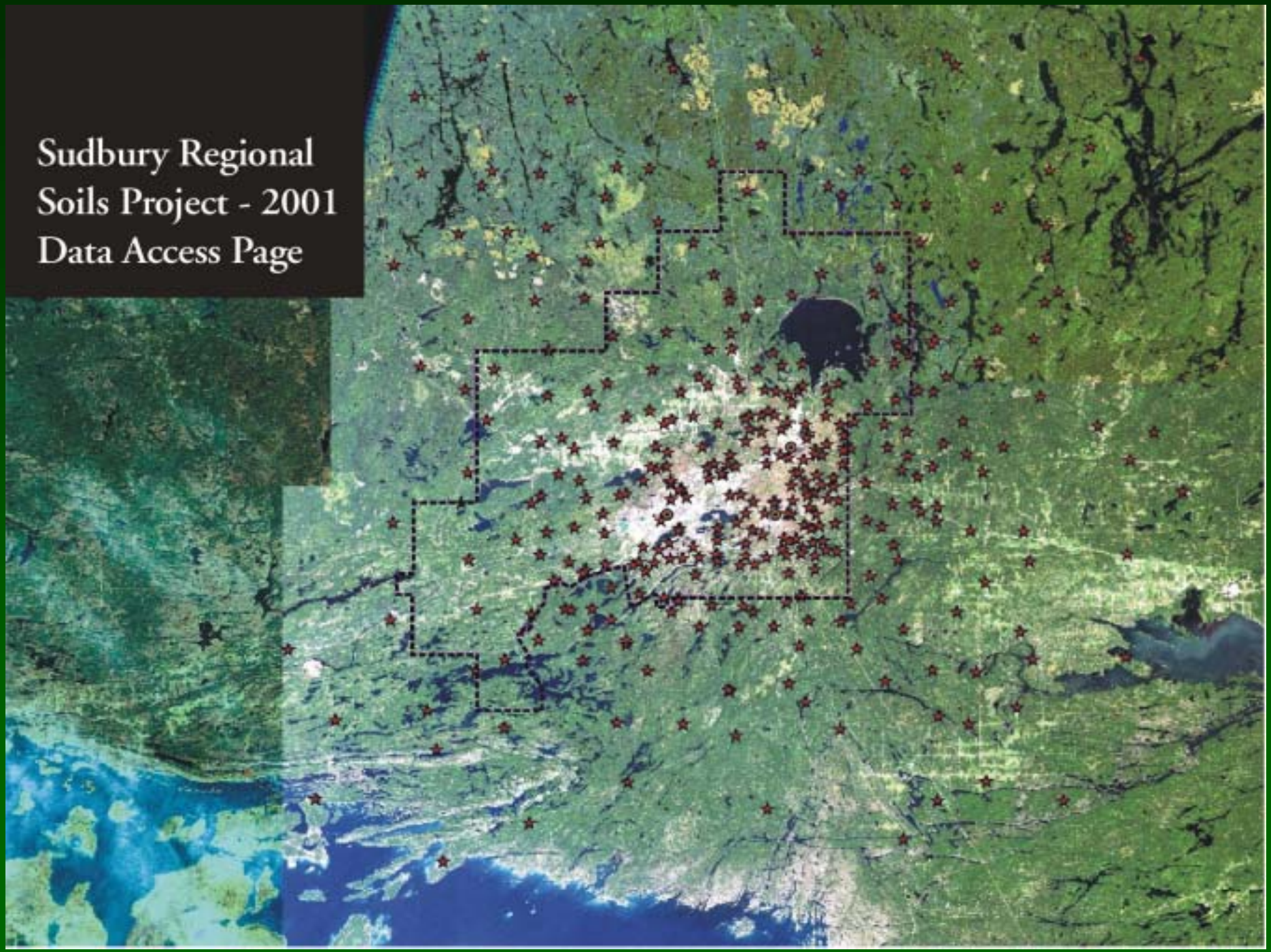
Partners in the Sudbury Soils Study

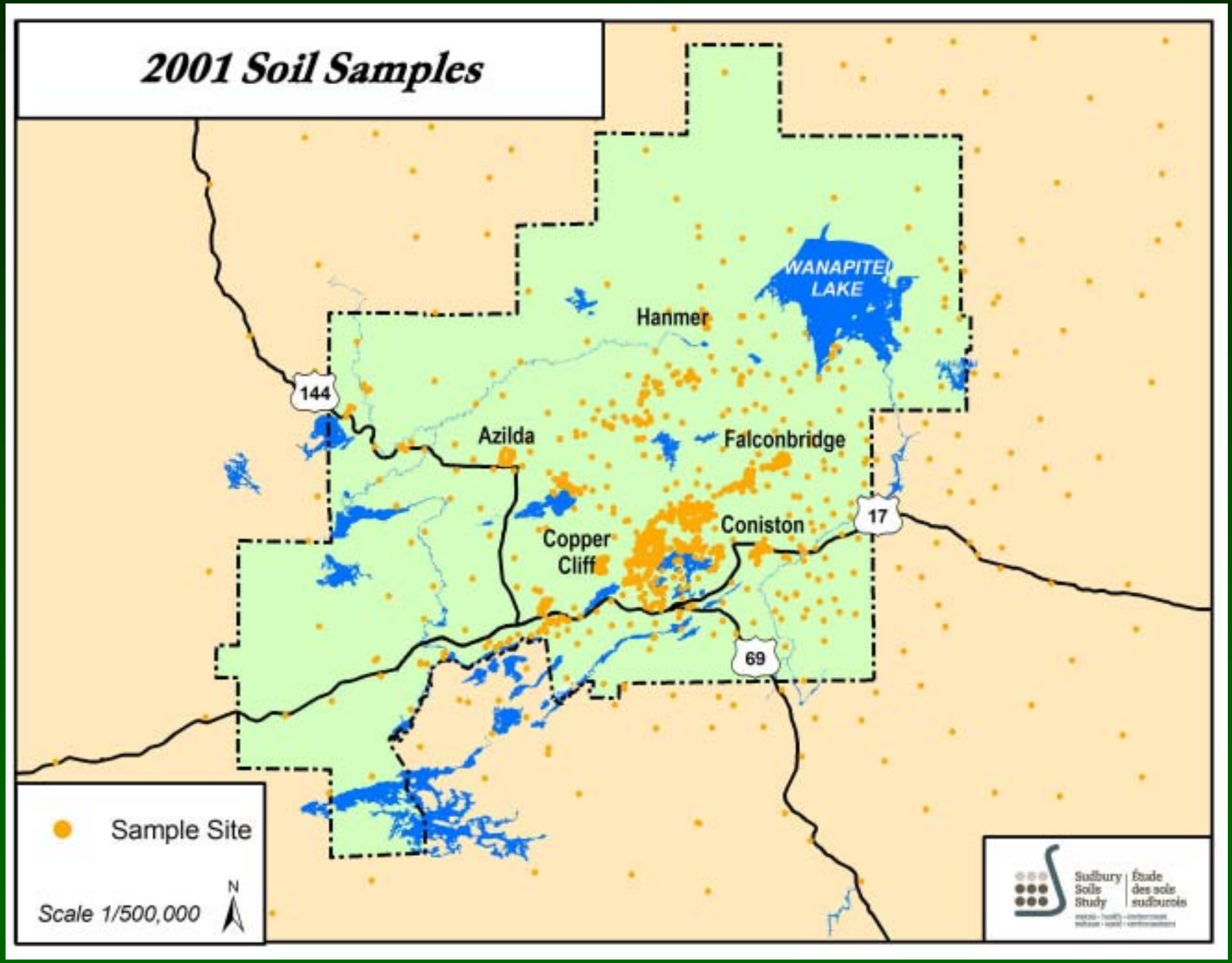
- Ontario Ministry of the Environment
- Sudbury & District Health Unit
- City of Greater Sudbury
- Health Canada, First Nations and Inuit Health Branch
- Falconbridge Ltd.
- INCO Ltd.

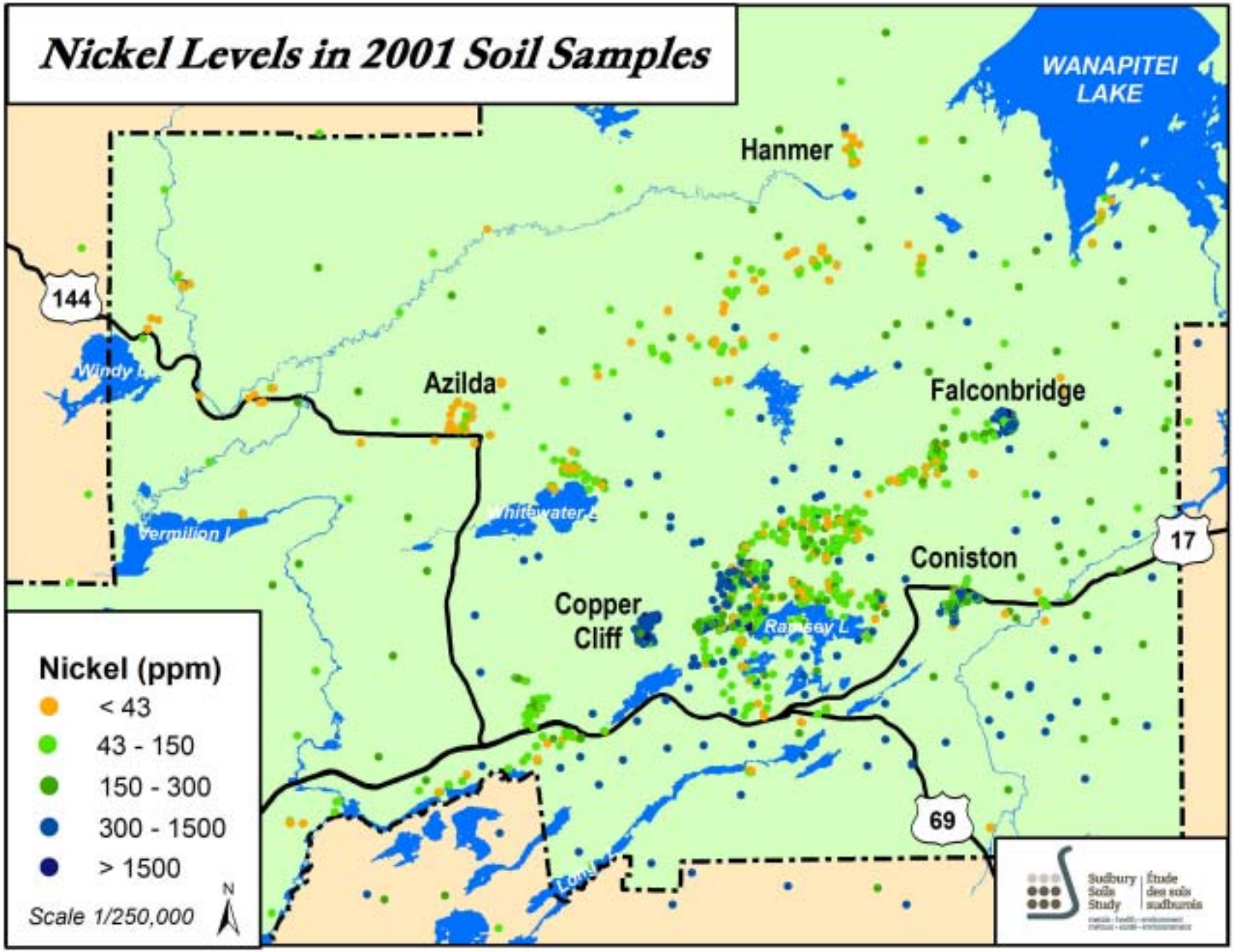
Sudbury Soils Study Overview

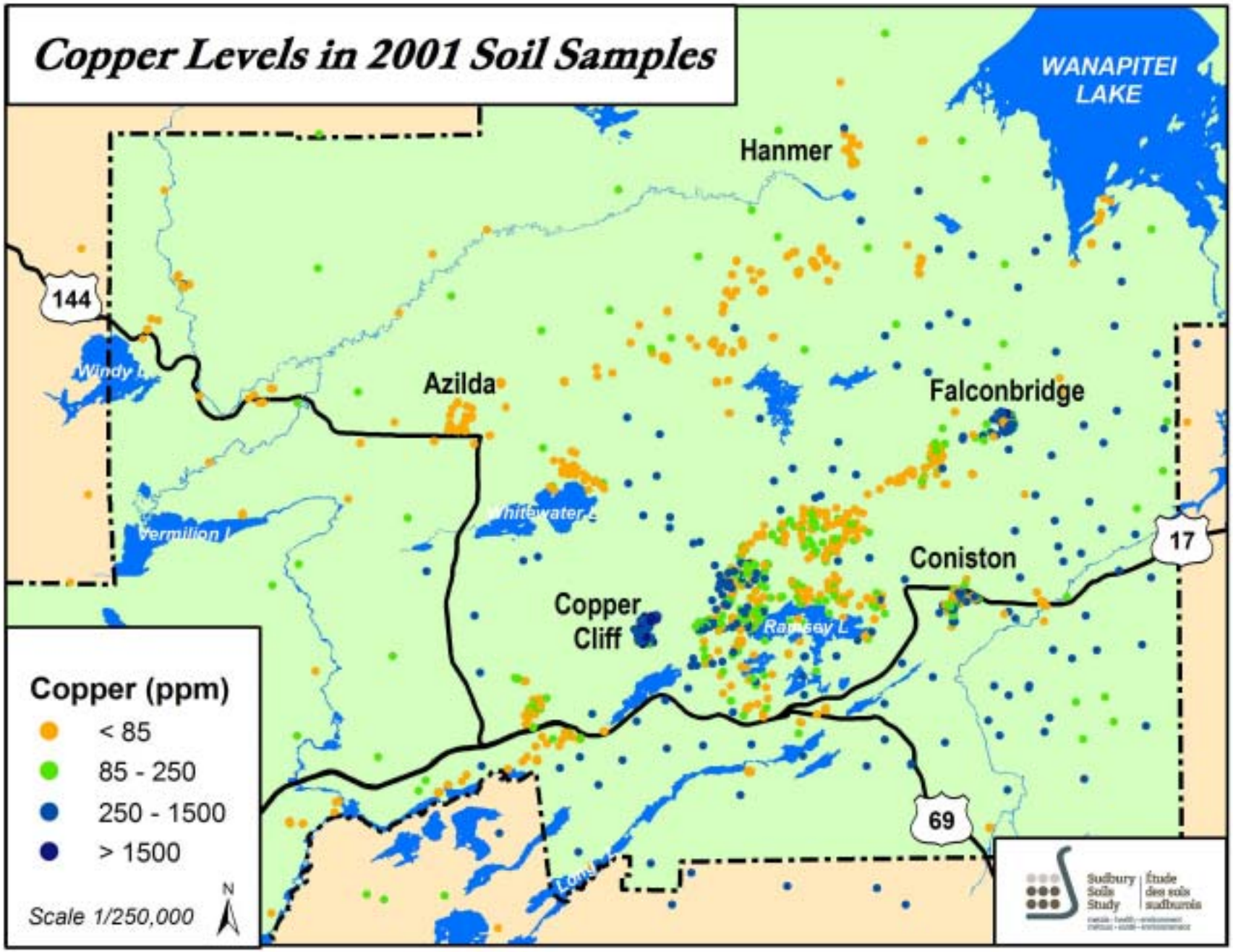


Sudbury Regional Soils Project - 2001 Data Access Page

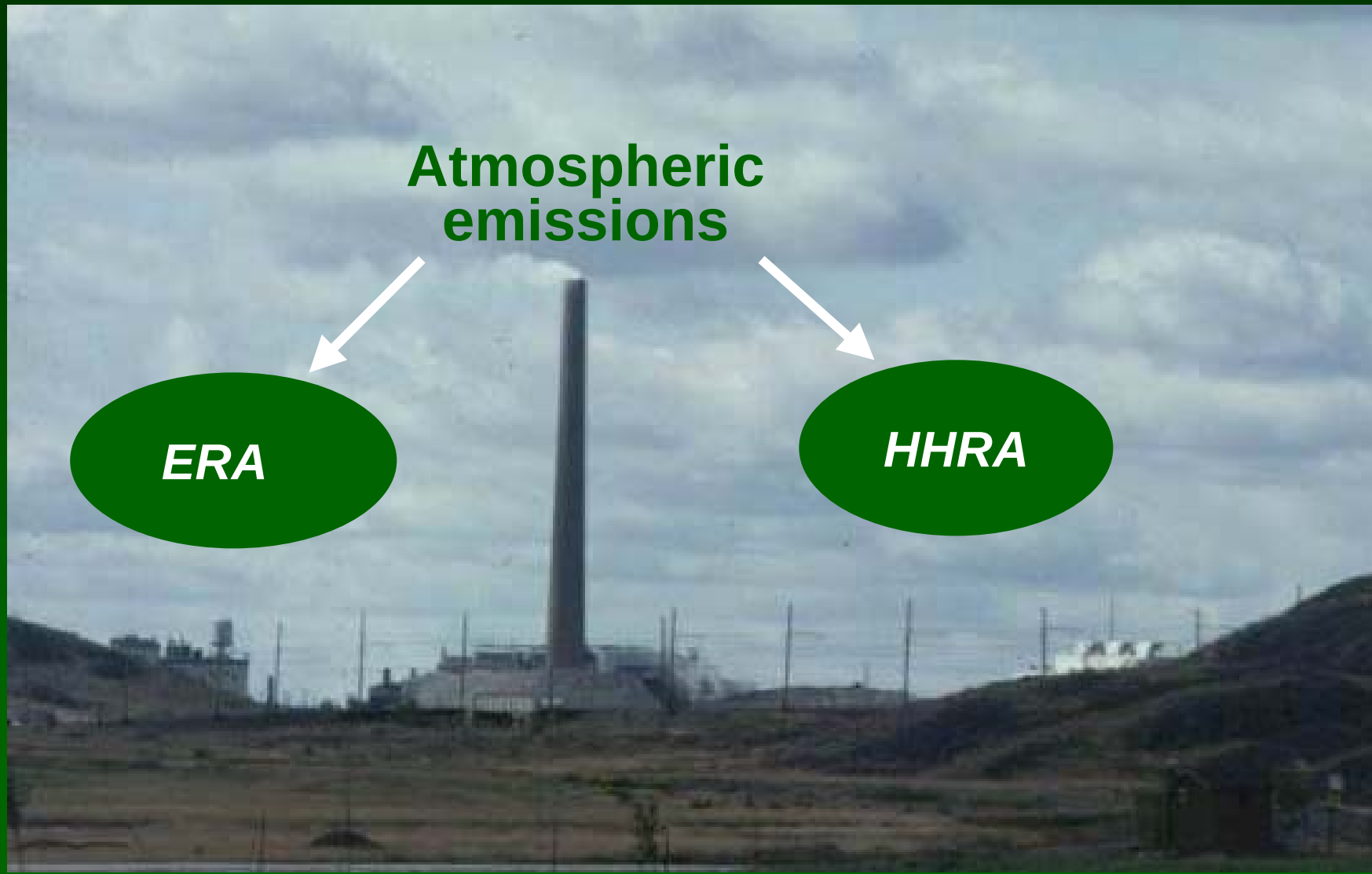



2001 Soil Samples
WANAPITEI LAKE
Hanmer
144
Azilda
Falconbridge
Coniston
17
Copper Cliff
69
Sample Site
Scale 1/500,000
N
Sudbury Soils Study
Étude des sols sudburois


Nickel Levels in 2001 Soil Samples
WANAPITEI LAKE
Hanmer
144
Windy L
Azilda
Falconbridge
Vermilion L
Whitewater L
17
Coniston
Copper Cliff
Ramsey L
69
Nickel (ppm)
< 43
43 - 150
150 - 300
300 - 1500
> 1500
Scale 1/250,000
N
Sudbury Soils Study
Étude des sols sudburois


Copper Levels in 2001 Soil Samples
WANAPITEI LAKE
Hanmer
144
Azilda
Falconbridge
Windy L.
Vermilion L.
Whitewater L.
17
Coniston
Copper Cliff
Ramsey L.
69
Copper (ppm)
< 85
85 - 250
250 - 1500
> 1500
Scale 1/250,000
N
Sudbury Soils Study
Étude des sols sudburois

Phase 2



Risk Assessment

…is a tool, or a process, for estimating the potential for adverse effects that could result from the presence of contaminants at a site.

Level of Risk Depends on Two Factors

RISK =

HOW MUCH IS TAKEN IN x HOW TOXIC IT COULD BE

Concentration in the environment

+

Amount of exposure

Estimated from

- Animal studies
- Laboratory studies
- Field studies

Human Health Risk Assessment – Measuring Exposure to Metals

INHALATION:
Air we breathe

INTAKE:
Food we eat;
liquids we drink

DERMAL CONTACT:
Exposure to skin

SOIL:
Chemicals in the soil

New Studies in 2003 as Part of Phase 2

…to provide Sudbury specific exposure data for the HHRA:

- Air Monitoring Program
- Vegetable Garden Program
- Fish Survey of Sudbury Lakes

Air Monitoring Program Purpose:

To provide inhalation concentration values for the HHRA exposure model.

Vegetable Garden Survey

Purpose:

To measure metal concentrations in home-grown vegetables and commercial produce and soils

- Data used for ingestion factors in HHRA model

Survey of Sudbury Urban Lakes

- Sudbury area lakes are important for local sport fishing enthusiasts
- The Laurentian-MNR Fisheries Co-op Unit gathered information on sport fishing on local lakes

Commitment to Using Local Expertise & Knowledge

Laurentian Faculty:

- J. Gunn
- G. Morgan
- B. Keller
- G. Parker
- D. Pearson
- G. Spiers

- Ontario GeoSciences Lab
- Other local industries

Mining is a way of life in Sudbury

What do Risk Assessments Do?

Look at present and future site conditions

Human Health	Ecological Integrity
Possibility that exposure will cause cancer or another health effect	**Possibility that exposure will cause adverse effects to plants or animals (individuals, populations, habitats, ecosystems)**

Outcome of the risk assessment aids in decision making:

1. Is remedial activity necessary?
2. If so, what remediation is required?

Sudbury Soils Study Timeline

Human Health Risk Assessment (HHRA)

Background Data Collection → Identify Chemicals of Concern (CoCs) → Identify Populations in Contact with CoCs in the Environment → Assess How People Come into Contact with CoCs → Risk Analysis → Conclusions and Recommendations Risk Management and Communications

Ecological Risk Assessment (ERA)

Background Data Collection → Identify Chemicals of Concern (CoCs) → Select Valued Ecosystem Components (VECs) → Assess How VECs Come into Contact With CoCs → Risk Analysis → Conclusions and Recommendations Risk Management and Communications

Project Start	"Have Your Say" Workshops	Public Open House	Public Open House	Public Open House	Public Open House
Winter 2003	May 2003	June 2003	November 2003	2004	Summer 2005