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EARTH SCIENCE SECTOR
GENERAL INFORMATION PRODUCT 99e

The Targeted Geoscience Initiative 4 Sedimentary Exhalative Ore Systems

Geological Survey of Canada

2013

Canada

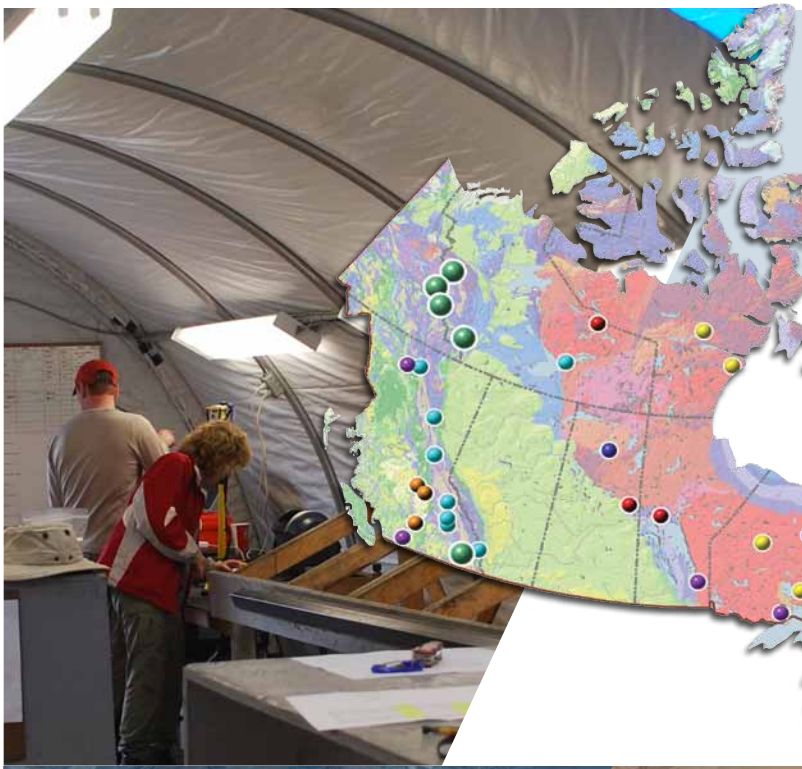
The Targeted Geoscience Initiative 4
Sedimentary Exhalative Ore Systems

Sedimentary exhalative (SEDEX) ore systems are a primary source for zinc and lead, as well as a significant source of silver, gold, copper, antimony, tin and barite. In 2010, Canada produced 693 014 tonnes of zinc with a domestic export value of $1.7 billion.[1] Canada supplies 5% of the world's zinc and 2% of the lead.[2]

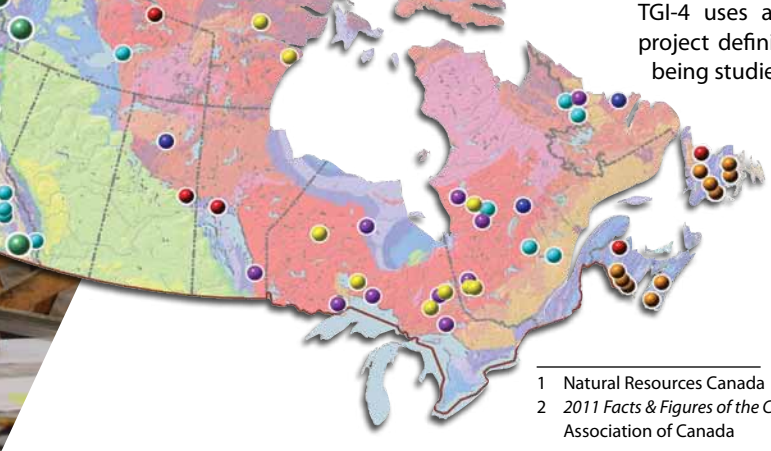
Over the past 25 years, there has been a major decline in Canadian mineral reserves, and without sustained and effective exploration, Canadian zinc and lead production will exceed additions to the reserves.

The current genetic model that describes the formation of SEDEX deposits was formulated 30 years ago, and many questions still remain unanswered. The role of post-rift carbonaceous sediments (organic-rich), host to the majority of SEDEX deposits, remains poorly understood, and there are few exploration indicators of ore potential in these rocks. Without the proper exploration tools, it is nearly impossible to discern rift basins that could contain traces of SEDEX mineralization and at which stratigraphic level these deposits are most likely to occur.

New SEDEX zinc-lead deposits may be buried far beneath the surface of the Earth. To find the deposits, it is important to understand why certain Canadian sedimentary basins are enriched with zinc and lead, while others are not. Knowing what affects the location, distribution and genesis of SEDEX zinc-lead districts is crucial to lowering the exploration risk inherent in searching for new deposits.



The Targeted Geoscience Initiative 4 (TGI-4) is a collaborative federal geoscience program that provides industry with the next generation of geoscience knowledge and innovative techniques to better understand, model and detect buried mineral deposits, reducing some of the risks of exploration.



TGI-4 uses an ore system approach to project definition. Seven ore systems are being studied:

- VMS
- Lode gold
- Intrusion-related
- Ni-Cu-PGE-Cr
- Specialty metals
- **SEDEX**
- Uranium

1 Natural Resources Canada
2 *2011 Facts & Figures of the Canadian Mining Industry*, Mining Association of Canada

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The SEDEX project is largely field-oriented and will bring together geology, mineralogy, geochemistry and three-dimensional reconstruction to improve SEDEX zinc-lead exploration models. The three main research areas of the project are:

- identify criteria to differentiate between barren and mineralized sedimentary basins;
- improve genetic and exploration models;
- identify cost-effective (routine, fast, accurate) vectors that will point to mineralized domains within basins.

Work is being conducted in Yukon (Howards Pass, MacMillan Pass and Anvil), British Columbia (world-class Sullivan deposit) and the Northwest Territories (Prairie Creek deposit and Misty Creek Embayment).

Targeted Geoscience Initiative 4: Increasing Deep Mineral Exploration Effectiveness

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