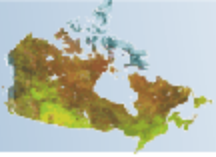


Update on the 9th ICARD, MEND and NOAMI

18th BC/MEND Workshop
November 30 and December 1, 2011

Gilles Tremblay and Charlene Hogan
MEND, NOAMI and GARD Guide
Secretariats





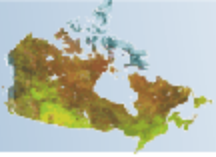
MEND Program

- 1989 – 2012
- Extensive national and international Network
- ~\$20M in 21 yrs
- Current research budget ~ \$115K/a
- Focused research work plan
- Information transfer



Whistle Mine



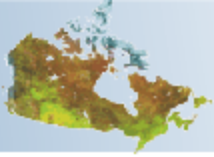


MEND Mission

Maintaining the momentum....

...to provide leadership and guidance on priority AD issues in Canada





MEND Steering Committee 2011

Elizabeth Gardiner (Chair), MAC

Gilles Tremblay (Secretariat), NRCan

Mike Aziz, Goldcorp Canada Ltd.

Kim Bellefontaine, Province of BC

Linda Broughton, BHP Billiton Mines

Leslie Cooper, Province of Ontario

Johanne Cyr, Province of Quebec

Charles Dumaresq, Environment Canada

Joe Fyfe, Xstrata Nickel

Charlene Hogan (Secretariat), NRCan

**Mike Nahir, Aboriginal Affairs and Northern
Development Canada**

Bill Price, NRCan

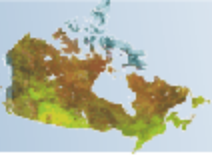
Ernest Armitt, Province of Manitoba

Maya Stano, Canadian Environmental Network

Wade Stogran, Pan American Silver Corp.

John Werring, Canadian Environmental Network





Cold Temperature Studies



**MEND 1.61.7 - Climate Change and Acid Rock Drainage:
Risks for the Canadian Mining Sector
(October 2011) (*Stratos Inc. with John Brodie*)**

- Risk-based approach and analysis
- Not a technical study
- Develop scenarios to highlight potential impacts of climate change on the mining sector
- Focus on risks related to mine drainage
- Provide guidance for decision makers
- More work planned in 2012



Recent Publications

MEND 2.46.1 Evaluation of the Water Quality Benefits From Encapsulation of Acid-Generating Tailings by Acid-Consuming Tailings (December 2010)(EcoMetrix)

Acid-generating tailings encapsulated by acid-consuming tailings

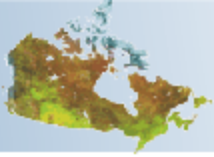
MEND 2.12.2b Field Assessment of the Occurrence of Algal Biofilm on Submerged Tailings (November 2010)(NRCan)

Identify physico-chemical conditions for biofilm formation, and clarify effects of biofilm on metal mobilization

MEND 1.61.5b Cold Regions Cover Research – Phase II (November 2010) (SRK and OKC)

Cold region phenomena characterized as to their possible role in soil cover performance



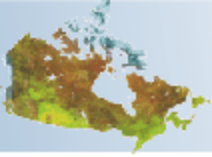


Sludge Management – Near Completion

Lime Treatment Plant Survey (NRCan)

- Review of acidic drainage treatment and sludge management operations
- Over 100 surveys received – nationally and internationally.
- Information includes: site background, AD characteristics, type of treatment, reagents, sludge composition, treatment issues, sludge management
- Base metal, precious metal, coal, and uranium mines and others
- Final stage of review



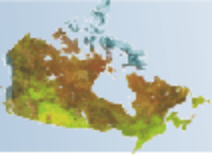


Sludge Management – Projects on the Go

Neutralization Sludge Characterization and Stability (Lorax)

- Investigate the geochemical composition and environmental stability of mine water treatment plant neutralization sludge
- Links between acidic drainage chemistry, treatment process and sludge composition defined for several sludge samples
- Detailed solid-phase characterization
- Relationship between sludge composition and *in situ* chemical stability to be defined for a range in depositional environments i.e. pit lakes, engineered impoundments



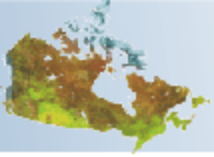


Cold Temperature Studies – Project on the Go

Risk-Based Study on Cold Regions Cover Design – Guidance Document (OKC)

- Sponsored by AANDC
- Information on key physical, chemical and biological processes affecting long-term risk to covers in the North
- Technical Advisory Group formed to provide advice on the study.
- Report organized into six chapters:
 - introduction and background information
 - attributes of cold regions and associated difficulties of cover system design
 - the potential objectives of cover system design
 - cover system design alternatives and their pros and cons
 - methodology to use to apply the tools and meet the objectives;
 - practical application of cover system design in cold regions.





Projects on the Go

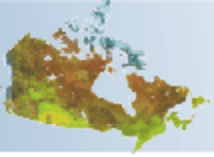
In-Pit Disposal of Tailings and Waste Rock (SENES)

- Update MEND 2.36.1 report completed in 1995
- 15 case studies detailed based on available information

Diavik Diamond Mine Waste Rock Study

- Scale-up study in cold climates
- To evaluate and prevent the possible ML/AD from waste rock



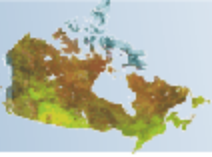


Projects on the Go

Vegetative Covers in Canada (OKC)

- Enhance predictive modelling capability to predict the influence of vegetation on cover system performance
- Review water use by plant species and communities used for re-vegetation of mine waste dumps and tailing storage facilities
- Input information into plant-atmosphere numerical models evaluation
- Develop guidelines to describe vegetation properties and functions that relate root mass development to soil moisture properties.



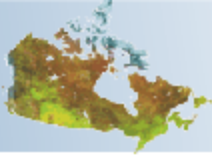


Projects on the Go

Nitrate and Remobilization/Attenuation of Se in Coal Mine Waste (Lorax)

- Literature review on interaction of nitrate with Se and other possible Se-bearing minerals (e.g. pyrite).
- Compilation of drainage chemistry data for mines in NE and SE BC to assess possible links
- Data collected for at least four mines in each region.
- If correlation is established → propose measures to co-manage the two parameters (i.e. explosive management practices).





X-Cutting – Technology Transfer

The MEND Monitor

Workshops (>30)

- Annual BC/MEND ARD/ML Workshops

MEND Website

9th ICARD

MEND Reports (>210)

MEND Manual

Global Alliance

- GARD Guide



The MEND Monitor

9th ICARD Comes to Canada
The 9th International Conference on Acid Risk Drainage will be held May 21 – 25, 2012 at the [Hilton Sheraton \(Ottawa\)](#). The event will feature specialized short courses, three days of technical presentations, poster presentations, a trade show and field trips. The conference is hosted by the MEND program, with support from the [International Network for Acid Drainage](#), [Elizabeth Gardner, Vice-President, Association of Canada](#), is the overall chair, with [Clara Trevisky, MEND Secretariat](#), and [Craig Ford, Metal Mining Corp.](#) the technical co-chairs. The Request for Submission of Abstracts will be sent out in early 2011.

MEND Steering Committee: Members of the MEND Steering Committee are gearing up for the 9th ICARD, and will play pivotal roles on the technical committees, and six session chairs and reviewers. Since its inception in 1980, MEND has been guided by a Steering Committee that brings together representatives from the Canadian mining industry, federal and provincial governments and non-government organizations. At present, MEND activities are funded by The Mining Association of Canada (MAC) and Natural Resources Canada (NRCAN), and administered by a secretariat at NRCAN. Funding for research projects has averaged \$125,000/year.

MEND Steering Committee Members 2010

- Elizabeth Gardner (Chair), MAC
- Mike Rice, Ontario Canada Ltd
- Kim Selsbach, Province of British Columbia
- Leslie Douglas, DFP Illinois Inc.
- Leslie Cooper, Province of Ontario
- Johannes Cyr, Province of Quebec
- Charles Dumas, Environment Canada
- Joe Pyle, Kinross Nickel
- Charles Hagan (Secretariat), NRCAN
- Mike Rubin, Indian and Northern Affairs Canada
- Bill Price, NRCAN
- Doree Price, Province of Manitoba
- Maya Davis, Canadian Environmental Network
- Mike Dugas, P.A. Resource Group Corp.
- Giles Trevisky (Secretariat), NRCAN
- John Henry, Canadian Environmental Network

Upcoming Events

- 14th Annual MEND-BC ARDML Workshop, The theme is New Developments and Innovations in Drainage Treatment, December 1-2, 2010, Vancouver, BC
- 10th International Conference on Mercury as a Global Pollutant, July 24-28, 2011, Halifax, Nova Scotia. www.mercury2011.ca
- 6th International Symposium on Waste Processing in the Mineral and Metallurgical Industries, October 2-5, 2011, Montreal, Quebec. www.6thisid.ca
- SRMINING 2011, First International Seminar on Social Responsibility in Mining, October 10-21, 2011, Santiago, Chile. www.ssrmining.com

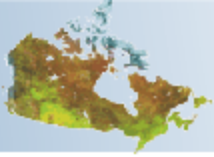
To obtain information on MEND or its publications, please send an e-mail to: mend@metnrcan.ca



Natural Resources Canada

Ressources naturelles Canada





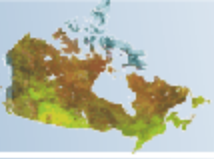
9TH International Conference on Acid Rock Drainage

Ottawa, CANADA

May 21-26, 2012

www.ICARD2012.ca

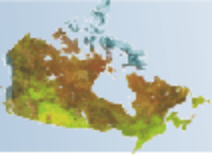




Conference Dates - May 20-26, 2012

-  May 20 and 21 – Short Courses
-  May 22 to 24 – Technical Program
-  May 25 and 26 – Field Trips
-  Held at the Westin Hotel, Downtown Ottawa
 - Expect over 500 people

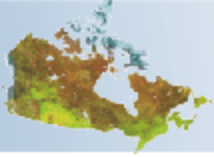




Organizing Committee

- Elizabeth Gardiner (MAC) - Conference Chair
- Craig Ford (INMET) – Conference Co-Chair
- Gilles Tremblay (NRCan) – Conference Co-Chair
- Bill Price (NRCan) - Technical Program
- Jim Robertson (Detour Gold) – Sponsorship/Exhibits
- Janice Zinck - Short Courses
- Lisa Lanteigne (Vale) – Field Trips
- Marilyn Fortin (MAC) – Social Program
- Paul Younger (Newcastle U) – Program Advisor
- Anne Chartrand/Ellyn Holtzman (Unconventional Planning)
– Conference Secretariats

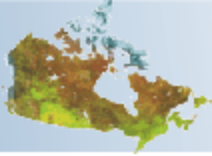




Technical Program

- Over 275 abstracts received
- 152 accepted for oral presentations in 4 concurrent sessions + 80 posters
- Themes include:
 - Prediction of Drainage Chemistry
 - Climate Issues
 - Drainage Collection and Treatment
 - Dry Covers
 - Mitigation
 - Monitoring, Maintenance and Other Measures to Sustain Successful Management
 - Pit Lakes
 - Social licence and Community Issues and Approaches
 - Underwater disposal





Our Sponsors...



DIAMOND PARTNERS



PLATINUM PARTNER



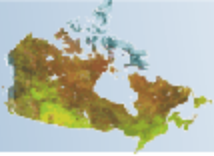
GOLD PARTNERS

HudBay Minerals



Teck





...Our Sponsors



SILVER PARTNERS



BRONZE PARTNERS

SGS

Province of Manitoba

OTHER PARTNERS

Mining Association of Canada

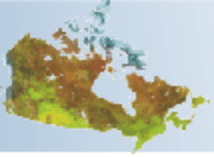
MEND

Agnico-Eagle

Vale

SENES

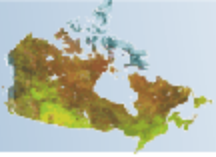




Next Steps...

- Finalizing Terms and Conditions for the short course
 - 16 proposals received
 - Sunday May 20 and Monday May 21
- Finalizing Field Trips – 4 proposed
 - Eastern Township (1 day)
 - Abitibi Region (2 days)
 - Sudbury (2 days)
 - Timmins
 - Elliot Lake

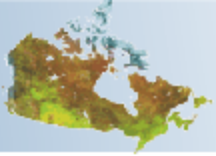




...Next Steps

- Web site – www.ICARD2012.ca
- Program at a glance on web site
- Finalizing the registration package
- Trade show not sold out (35 booths)





The Global Alliance

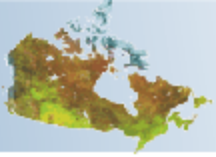


Acid Drainage Technology Initiative

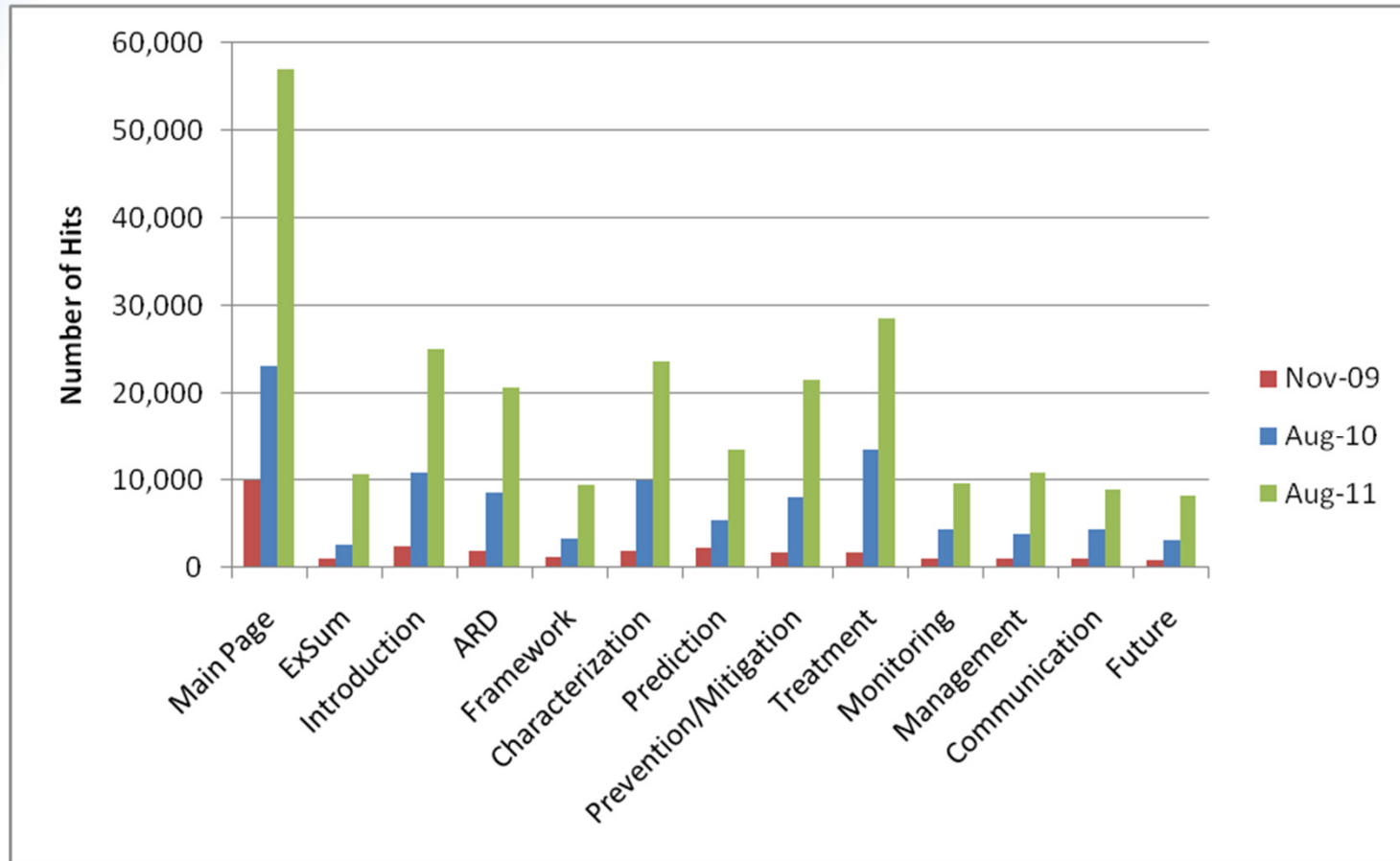


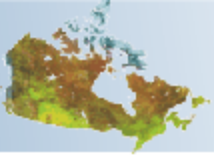
The Chinese Network for Acid Mine Drainage





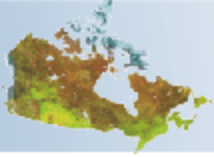
GARD Guide Usage





GARD Guide Updates

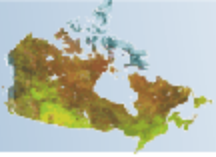
- Current update – 4th quarter 2011
 - Characterization: Dr. Stuart Miller (EGi)
 - Prediction: Dr. Bill Price (NRCCan)
 - Prevention: Dr. Ron Nicholson (Ecometrix)
 - Treatment: Ms. Janice Zinck (NRCCan)
 - Functionality upgrades



GARD Guide Updates

- You can participate!
- On-line at www.gardguide.com
- Workshops with support from GA
 - Chile – Enviromine (November 2011)
 - USA – Reno (November 2011)
 - Indonesia (February 2012)
 - China (November 2012)
- Next major milestone – Summer 2012 (9th ICARD, Ottawa)



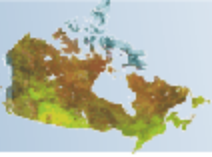


National Orphaned / Abandoned Mines Initiative - (NOAMI)



Brewery Creek – near Dawson Creek, Yukon





National Orphaned/Abandoned Mines Initiative (NOAMI)

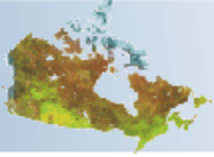
Multistakeholder consortia created in 2002 and reports to Canadian Mines Ministers

Does not have mandate or \$ to clean up mine sites

NOAMI's role is to:

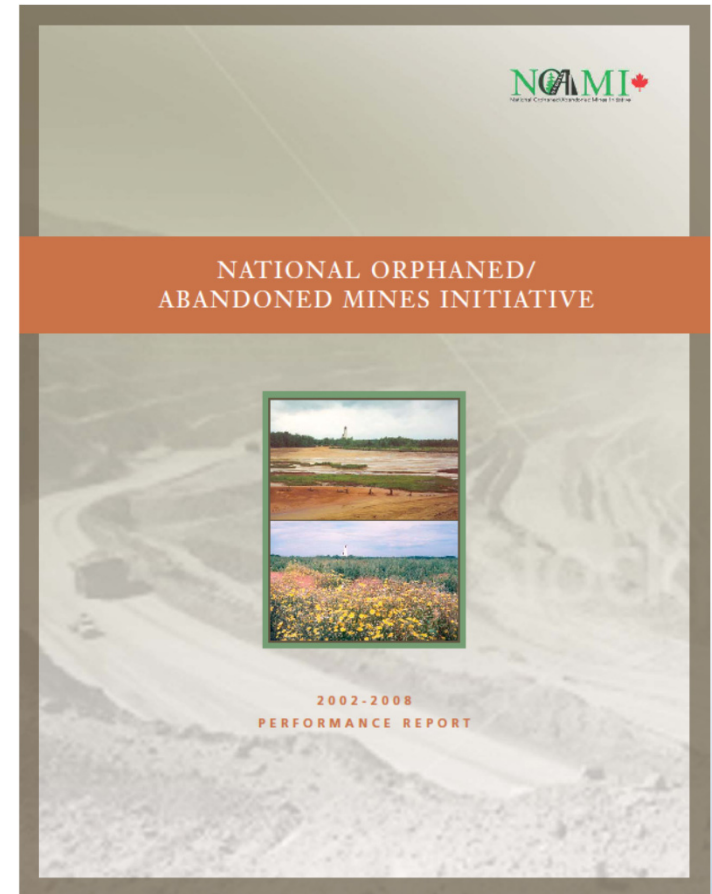
- Identify obstacles or barriers to progress
- Develop approaches to eliminate or reduce barriers
- Communicate results and information through reports, website and workshops
- Influence decision makers and enable more informed choices





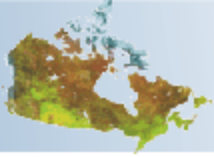
Performance Report (2002 – 2008)

- Summarizes the work of NOAMI since its inception, including publications and activities
- Outlines its impacts and benefits, and the role of the stakeholders
- Includes the accomplishments of the jurisdictional partners
- “Looking Ahead” section notes remaining challenges and future recommended activities



www.abandoned-mines.org





**THE POLICY FRAMEWORK IN CANADA FOR MINE CLOSURE
AND MANAGEMENT OF LONG-TERM LIABILITIES:
A GUIDANCE DOCUMENT**

Prepared for:

NATIONAL ORPHANED/ABANDONED MINES INITIATIVE

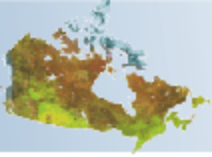
By

**W.R. Cowan, W.O. Mackasey and John G.A. Robertson
Cowan Minerals Ltd.
Sudbury, Ontario**

November, 2010

Post Closure: Return of Mine Lands to the Crown

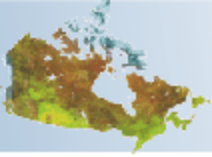
- Guidance document is the first step in multi-stage process
- Cowan Minerals selected as contractor
- Report on website



Study Undertaken to:

- Explore current situation of mine closure and post-mine closure in Canada and internationally
- Provide a policy framework for mine closure through return of lands to the Crown (relinquishment).
- Prepare a guidance document for a diverse group of stakeholders:
 - Industry, Aboriginal Canadians, government & non-government organizations, jurisdictions upgrading their programs, etc.
- Prevent/limit further mine abandonment in Canada.

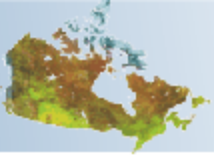




Overall Summary of Cowan Report

- Process of closure planning and provision of financial security relatively well developed and consistently applied across Canada.
- A great deal of policy and scientific attention and filling of policy void has occurred
- Policy around long term management of sites beyond closure (“Post-closure”) including methods of returning land to government, were nearly non-existent in Canada and elsewhere- with a few notable exceptions (e.g. Saskatchewan).

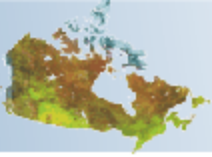




Highlights of NOAMI Workshop

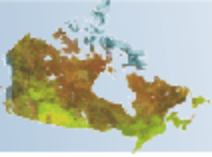
Key ideas raised in small group discussion sessions:

1. When it is acceptable and unacceptable to return mining lands to the Crown and the terms and conditions that must be in place.
2. Recommended solutions to key issues related to **Site Risk Management, Funding and Legislation, Policy and Regulation.**
3. Top three barriers to implementing the above solutions and the actions that should be taken to address them.



Recommendations to NOAMI

- ✓ Create a Decision Tree for Return of Lands to the Crown
 - Checklist to facilitate decision-making process
 - Framework developed for SK covers many of the issues that need to be addressed
- ✓ Prediction What Will Happen at a Mining Site
 - Improve predictive capacity
- ✓ Is Return of Lands to the Crown Desirable?
 - NOAMI should ensure that processes are in place for jurisdiction to adopt, when and where desirable
- ✓ Third Party Oversight
 - Should have a role in overseeing oversight process
- ✓ The Importance of Focusing on Regulatory and Policy Issues/Questions
 - NOAMI to avoid technical issues - focus on policy

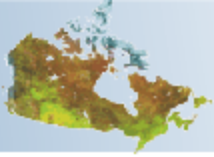


Next Steps for NOAMI

Create a strategic road map to identify and provide for those instances where return of mining lands to government is feasible and appropriate.

Route:

- Develop research plan to further explore key points of workshop
- Obtain stakeholders perspectives on issuance of a release – when acceptable or unacceptable
- **Examine Saskatchewan Institutional Control Program as learning tool for development of a framework**
- Develop communications strategy to track work on this subject



Mine Environment Neutral Drainage (MEND)
www.mend-nedem.org



9th International Conference on Acid Rock Drainage
www.ICARD2012.ca

National Orphaned/ Abandoned Mines
Initiative (NOAMI)

www.abandoned-mines.org





*La cité de l'or
Val d'Or, Québec*

**Merci
Thank you**



Natural Resources
Canada

Ressources naturelles
Canada

Canada 