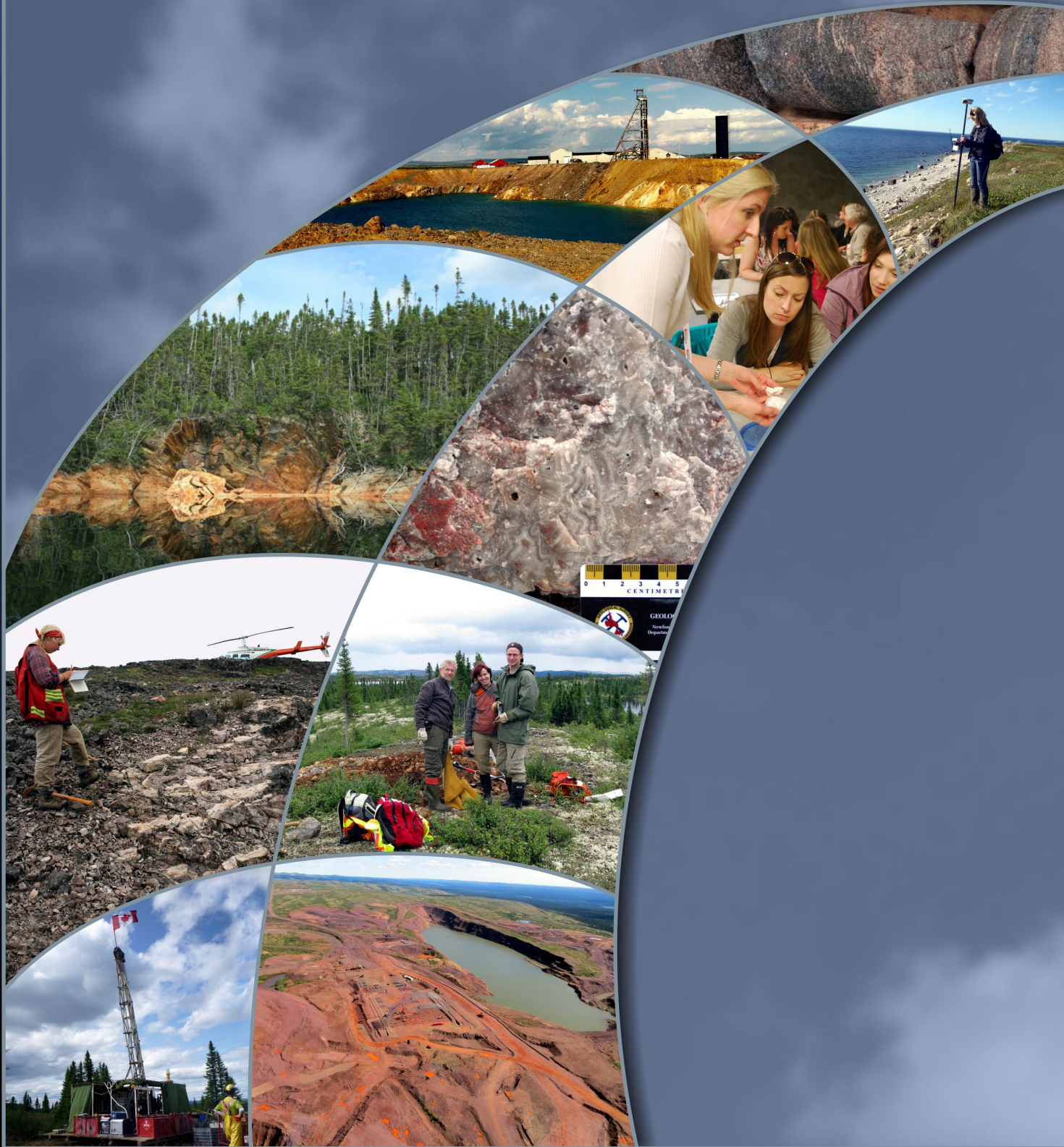


REVIEW 2012



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DEPARTMENT OF NATURAL RESOURCES

Mines Branch Review 2012

The Mines Branch, of the Department of Natural Resources, is responsible for: managing the province's mineral resources to ensure that its contribution to the economic and social well-being of the province is maximized, sustained and enhanced; increasing the body of knowledge on the province's mineral resources; encouraging the orderly exploration and development of these resources; assessing their economic potential and economic contribution to the province; formulating mineral policy and providing advice to government on all mineral related matters. The branch operates under the departmental vision of Newfoundland and Labrador as a province that realizes the full benefit from the sustainable development of its natural resources.

The mineral sector, following last year's record shipments and exploration, is forecast to have another strong year despite weakening prices for many commodities. Employment in the mining sector is forecast to be at an all time record high of nearly 8000 person years, due to a combination of sustained activity throughout the sector, and construction at the Long Harbour nickel processing plant reaching peak employment.

Mineral shipments and exploration expenditures, although down on forecasts earlier in the year, will remain at very high levels. Gross value of shipments is expected to be about \$4.1 billion, compared to \$4.6 billion for 2011 and \$3.8 billion recorded for 2010. Mineral exploration continued to operate at high levels during 2012. Forecast statistics for exploration indicate that claim-staking and diamond drilling have declined, but exploration expenditures remain high, estimated at about \$194 million (the highest on record) in 2012 compared to \$157 million in 2011.

The past year has seen some major staff changes. Charles Bown was appointed Deputy Minister in September. Walter Parsons was appointed Executive Director, iron ore, in August, and following the retirement of Ken Andrews, Jim Hinchey was appointed Director, Mineral Lands Division.

The Mines Branch has three divisions: the Geological Survey, the Mineral Development Division, and the Mineral Lands Division.

The **Geological Survey of Newfoundland and Labrador** is responsible for mapping the geological framework of the province to interpret and explain its geological evolution, and to describe, interpret and explain the distribution,

nature, quantity and origin of the province's mineral resources.

The **Mineral Development Division** is responsible for the technical and economic analysis of the mining industry in the province. It also provides training and assistance for prospectors, and provides advice to all provincial and federal government agencies that provide financial support or assistance to mining projects.

The **Mineral Lands Division** is responsible for legislation and regulations governing the administration of the province's mineral and quarry material resources and their exploration and development.

The Geological Survey had an active field program, with new projects in Labrador evaluating iron ore and diamond potential amongst others. Partnerships with the Geological Survey of Canada resulted in significant improvements in geoscience knowledge in western Labrador with a major geophysical survey.

The Mineral Incentive Program continues to provide important financial support to junior exploration companies and prospectors; a total of \$2.5 million was allocated to this program in 2012-13. The branch has a strong commitment to prospector training, and supports an annual training course in Stephenville.

Commitment to sustainable mining practices was demonstrated through further work on tailings dams at former mines near Baie Verte, Springdale and South Brook, as well as continued maintenance at the former Hope Brook mine.

The Mineral Lands Division has continued enhanced efforts in ensuring compliance to exploration permit conditions with an inspection program, as well as working with exploration companies to minimize environmental impact through following best practices.

2012 has seen several new mining projects moving forward, with one new mine producing. The future seems promising with other mines or expansions in construction, or in advanced feasibility studies. The Labrador Trough continues to be a focus for exploration and development, and iron ore development promises to remain a major contributor to employment and economic development in the province.

Government's own exploration work on the Julianne Lake iron deposit has identified another significant opportunity for mine development in the Trough. Proposals to bring this project forward are now being sought, and the project has potential to realize further benefits for the people of Newfoundland and Labrador.

David Liverman
Assistant Deputy Minister

GEOLOGICAL SURVEY

Three goals of the Departmental Strategic Plan are to enhance the knowledge-base of geoscience data, to identify opportunities for resource development, and to improve the promotion of these opportunities. The 2012-13 programs of the Geological Survey of Newfoundland and Labrador (GSNL) directly address these goals mainly through its field programs, retention of qualified staff, and successful promotional activities. Budget 2012 awarded GSNL \$6.06 million. This was a slight reduction from the previous year.

More than \$2 million was again allocated to field activities this year. In Labrador, there are three major projects and the expansion of a fourth into southern Labrador. These are: 1) a detailed mapping program covering the western end of the Seal Lake Group that also included bedrock geochemical sampling of the Michikamats syenitic ring complex and sampling and prospecting and bedrock sampling of part of the Michikamau anorthosite; 2) the start of a new long-term project to study the iron-ore deposits of western Labrador, from the deposits near Schefferville to Labrador City; and 3) a new program of collecting sand samples for diamond indicator minerals and gold from numerous eskers within the Archean Ashuanipi Complex of western Labrador. The fourth, the coastal erosion project, moved into Southern Labrador where the area between L'Anse au Clair to Forteau was examined.

On the Island, eight field projects (6 ongoing and 2 new initiatives) include: 1) the conclusion of the surficial mapping and till geochemistry project in northeast Newfoundland that, this year, covered Fogo Island and Change Islands; 2) gold and silver mineralization on the Burin Peninsula and western Avalon Peninsula; 3) gold mineralization in central Newfoundland and the White Bay area, 4) the regional surficial mapping and till geochemistry in the Noel Paul's Brook to South Brook area, Central Newfoundland, 5) the continuation of the coastal erosion project around Newfoundland, and 6) new detailed mapping in the Port au Port and Belburns areas of western Newfoundland. New projects are 1) the study and economic availability of aggregates in the Clarenville area, and 2) a short-term project on the base-metal prospect at Long Lake in south-central Newfoundland.

Our outreach and education project saw continued program delivery to six schools on the north coast of Labrador, and a substantial teachers' workshop and fieldtrip delivered in conjunction with 2012 GAC-MAC Joint Annual Meeting held in St. John's.

Laboratory and office-based research studies continued on the northern Labrador Strange Lake rare-earth-element (REE) deposit and other REE prospects in central and southeastern

Labrador, the results of several lake-sediment geochemistry projects, data and map compilation for inclusion in Geoscience Online, and written reports of the geology of the Nain area, and also the Indian River–King's Point area. Several bedrock geology maps are close to completion including the Bonavista and Trinity map areas, the Indian River–King's Point area (at 1:25 000 scale) and the Makkovik area.

The results of major airborne geophysical surveys in north-western Labrador and adjacent Québec were released this year. This survey was contracted directly by the Geological Survey of Canada (GSC), as part of the Geo-mapping for Energy and Minerals (GEM) Initiative and the Targeted Geoscience Initiative - 4 (TGI-4). Thirty-two detailed aeromagnetic maps, covering 16 NTS map areas at 1:50 000-scale, were released. The areas covered are contiguous between Strange Lake and Border Lake. Of the 16 map areas surveyed, 12 include Labrador entirely or in part, and 4 map areas are entirely in Québec. The Strange Lake area was surveyed in greater detail and included a gravity survey as well as an aeromagnetic survey for a total of 4 maps published at a scale of 1:25 000. The maps from both surveys, along with the digital data, are available on-line from the GSNL, the GSC and Géologie Québec.

The geoscience program employed 23 summer field and office-support students, most of whom are enrolled in earth science degrees at Memorial University. As well as assisting the GSNL, this employment with the Survey provides future geoscientists with a valuable opportunity to train with our experienced field and office staff.

The GSNL leads the minerals promotional efforts of the Mines Branch. The branch had a strong presence at the traditional venues (Mineral Resources Review in St. John's, Baie Verte Mining Conference, Expo Labrador in Happy Valley-Goose Bay, Exploration Roundup in Vancouver, Québec Exploration in Québec City, and the PDAC in Toronto), and again was part of the Canadian delegation at the China Mining meeting in Beijing and associated meetings in other Chinese cities. Visiting delegations from the China Geological Survey and various Chinese minerals industry groups were also assisted by the Survey.

Staff Changes

There have been several staff changes in the Survey this year. In December, 2011, **James Conliffe** joined the GSNL to be the project geologist for iron ore research. In 2012, **Alana Hinchey** took over as Senior Geologist for the Regional Geology Section and **Trina Adams** joined the Mineral Deposits Section as a Mineral Occurrence Data System (MODS) geologist. In March, **Norm Mercer** retired from the Geological Survey after 33 years of service and **Phil Saunders** was appointed as the new Mineral Industry Consultant. In April, **Monica Squires** was transferred to the Regional Geology Section. In May, **Gillian Simms**

moved from the Geoscience Data Management Section to a temporary assignment with the Energy Branch's Petroleum Engineering Division. She was replaced for three months by **Christina Pretty**. In June, **Lawson Dickson** was appointed Director of the GSNL, replacing **Dave Liverman** who had been appointed Assistant Deputy Minister for the Mines Branch. In October, **Kim Morgan** joined the Geoscience Data Management Section.

Linkages and Partnerships

The GSNL benefits through links and partnerships with other branches of government, both provincial and national, with academic institutions, Federal Government and non-governmental organizations and with national and international geoscience organizations. The partnership between the Canadian Institute of Mining, Metallurgy and Petroleum (Newfoundland Branch) and the Mines Branch of the Department of Natural Resources results in the annual Mineral Resources Review conference. The partnership between the Geological Survey and the Canadian Institute of Mining, Metallurgy and Petroleum (Newfoundland Branch) and the Department of Education continues with the preparation and distribution of 'rock kits', a collection of provincial rocks and minerals for use in schools. The Mines Branch is in partnership with the CIM Newfoundland Branch, Mining Industry NL and PEGNL for the promotion of Mining Week. With the Department of Tourism, Culture and Recreation, the Geological Survey is helping to develop the province's geotourism potential as well as continuing work on the province's paleontological and other initiatives such as the World Heritage Status proposal for Mistaken Point and the Bonavista Peninsula Geopark proposal. The GSNL works closely with the Department of Environment and Conservation on groundwater issues and climate change, and provides advice to Fire and Emergency Services - NL and also to Transportation and Works and municipal councils on potential geological hazards. The GSNL also provides geological expertise to the Department of Transportation and Works for the assessment of submitted aggregate samples, used in road construction and asphalt paving. A long-standing relationship with the Geological Survey of Canada continues with the multidisciplinary projects in western Labrador as part of the GEM and TGI-4 initiatives.

As well as servicing the exploration and prospecting community, mainly through our Geoscience Publications and Information Section, GSNL partners with Mining Industry NL and the Earth Sciences Department at Memorial University on the Matty Mitchell Prospectors Resource Room. Some of our staff also instruct at prospecting courses organized by the Mineral Development Division, Mines Branch. Several geologists have adjunct appointments in the Earth Sciences and Geography departments at Memorial University, and serve on supervisory committees for graduate students. A consultative relationship has been established with the Newfoundland and Labrador Research and

Development Council (RDC). We also provide direct and indirect support for research projects at Memorial University, and other academic institutions. The GSNL is a strong supporter of the geoscience community in the province, with several staff members holding significant positions in the national and local branches of the Geological Association of Canada, the Canadian Institute of Mining, Metallurgy, and Petroleum and the Atlantic Geoscience Society.

Organizational Structure

The GSNL is organized into five sections under the direction of **Lawson Dickson**. The sections are Geoscience Data Management (Senior Geologist **Larry Nolan**), Mineral Deposits (Senior Geologist **Andrew Kerr**), Regional Geology (Senior Geologist **Alana Hinchey**), Geochemistry, Geophysics and Terrain Sciences (Senior Geologist **Martin Batterson**), and Geoscience Publications and Information (Senior Geologist **Sean O'Brien**). The Geochemistry Laboratory, part of the Geochemistry, Geophysics and Terrain Sciences Section, is under the direction of **Chris Finch**.

Director's Office

The Director's office is responsible for the administration of the GSNL, logistical support of both office- and field-based programs, and liaison with other divisions in the Mines Branch. The Director represents the GSNL on the Committee of Provincial and Territorial Geologists and the National Geological Surveys Committee. With Government's commitment to long-term funding of geoscience, the GSNL is proceeding with its five-year plan for the period 2010–2015, a plan that was reviewed and accepted by representatives of the mineral and oil exploration industries and academia.

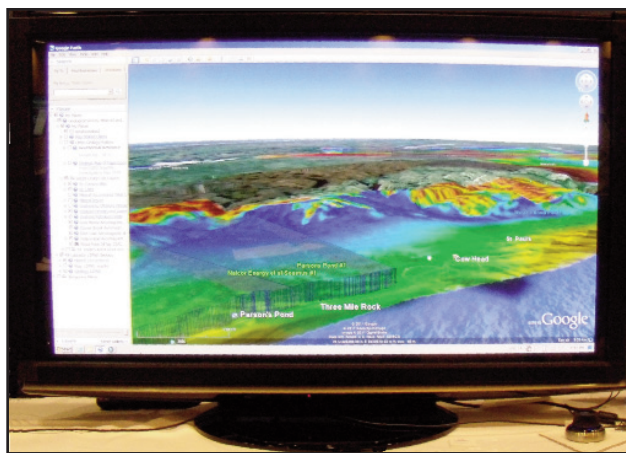
The Director's office is responsible for the financial operations of the GSNL. **Cordell Deering** is responsible for all requisitions, purchasing and payments. Logistical and communications support of field crews are handled by **Gerry Hickey** (Newfoundland) and **Wayne Tuttle** (Labrador). They also maintain all the GSNL field equipment and vehicles. Field-safety training courses, including first aid, ATV, boat and helicopter safety, driver education, and chainsaw training are coordinated by Cordell Deering. Gerry Hickey is our certified ATV safety instructor. Wayne Tuttle also carries out quarry inspections for Central Labrador.

During 2011 and so far in 2012, there were no lost-time incidents or near misses. This was recognized by the AMEBC – PDAC "Safe Day Every Day" Award presented to the Newfoundland and Labrador Geological Survey for the second year in a row.

Geoscience Data Management Section

The Geoscience Data Management Section is responsible for the organization, management, integration and distribution of the geoscience information collected by the Geological

Survey. As the size and number of geoscience datasets has grown, it is important that digital techniques are used to manage this information and apply it effectively to mineral exploration. Significant changes in digital information and communications technology over the past decade, are completely transforming the way in which geological surveys throughout the world manage and disseminate their geoscience knowledge. In response to these changes and client needs, the section has focused on database management techniques and internet tools for the consistent and timely delivery of geoscience information to government scientists and industry clients.



Detailed aeromagnetic image of the west coast of Newfoundland draped over a 3-D terrain map in Google Earth.

The section is headed by Senior Geologist **Larry Nolan**. **Loretta Crisby-Whittle** is responsible for the bedrock-geology database for the province. The Geoscience Atlas, on-line delivery of geoscience information, on-line data standards and integration are coordinated by **Pauline Honarvar**. **Kim Morgan**, recently joined the section, and provides support to all projects as well as to various projects in other sections of the Survey. **Harjit Missan** looks after the IT and equipment needs for the GSNL.

The digital bedrock geology dataset has been completed for the island portion of the province and work is under way to continue the process of compiling the same for Labrador. The dataset incorporates information from the most detailed bedrock geology maps for the province and applies a common legend series. Updates will be made to the bedrock geology map theme layer on the Geoscience Atlas as newly published maps become available. Images of the original published maps from which the dataset was built are available for download in Portable Document Format (.pdf) from the Survey Website Map Index page.

The web-based Geoscience Atlas is continuously being updated and reorganized. Layers which have been updated recently consist of Till Geochemistry, detailed Surficial Geology, Striation database, Drill Core database, and

Airborne Geophysical Surveys index. These are in addition to those layers that are updated automatically: Mineral Claims are updated in real time, Mineral Occurrences and Quarry Sites are updated every night, and Historical Claims are updated quarterly. Various help files have been updated as well, including the Map Viewer HELP, which now contains answers to Frequently Asked Questions.

The Geoscience Atlas will be reorganized in the coming year. Changes include converting the Map Themes into groups similar to the Geochemistry Sites and Mineral Lands groups. A few new layers will be added including a Forestry Water Crossings layer, Sensitive Wildlife Areas and a new set of layers for Energy Information.

Mineral Deposits Section

The Mineral Deposits Section (**Andrew Kerr**, Senior Geologist) is responsible for the documentation of metallic and non-metallic mineralization, conducting related research studies, and developing assessments of regional mineral potential.

Mineral Occurrence Data System (MODS)

MODS is a detailed database of mineral occurrences that incorporates public-domain information from mineral exploration and Geological Survey research reports. MODS is managed by **Greg Stapleton** with the assistance of **Jan Smith** and **Trina Adams**. MODS is continually updated using available public-domain records. During 2012, NTS map areas 1L, 1M, 1N, 2C, 2D, 2E, 3D, 11O, 12A, 12G, 12H, 12I, 13A, 13F, 13J, 13K, 13L, 13M and 23B were updated, in part. Work on systematic updates of NTS map areas 11O and 12H continued. MODS is accessible through the survey website and through the Geoscience Atlas, and is a real-time database, and new or updated occurrences become available online within 24 hours after input. A new mineral commodity report on Iron Ore will be available for Mineral Resources Review 2012 based on information provided by MODS.

Research on Uranium Mineralization

During 2012, there was renewed interest in exploration throughout the Central Mineral Belt of Labrador. A comprehensive report on results from the previous project in this area (2007 to 2009) is now in preparation by **Greg Sparkes**. This report will also summarize the large amounts of data available from exploration programs over that period, much of which is now public domain. Greg's work on innovative methods for imaging the distribution of radioactivity in mineralized samples will be published in *Exploration and Mining Geology*.

Research on Iron Ore Deposits

The implementation of a new project on research into the iron-ore deposits in western Labrador commenced in 2012. This new project is being carried out by **James Conliffe**.

Labrador West is prominent as a world-class iron ore district but there is limited scientific information on these deposits. Regional variations, genesis and controls on iron-ore mineralization are included in this research.

Detailed work was completed by James Conliffe on the Julienne Lake iron ore deposit, where the Mineral Development Division completed evaluation drilling in 2010. This included logging numerous drillholes archived in Goose Bay and mapping the area around the deposit. Initial results indicate that the deposit has undergone intense deformation including recumbent folding and thrusting. There are similarities between this deposit and the currently producing Wabush Mines deposit. Systematic sampling and mapping of the iron-ore deposits across western Labrador will provide a database that can be used to assess variations in their geology and geochemistry, and also evaluate various models for the processes involved in generating these world-class high-grade iron deposits.



Banded metataconite ore from the Julienne Lake Deposit, displaying coarse-grained specular hematite.

Research on Base-metal Mineralization

Projects on base-metal mineralization by **John Hinchey** continued in 2012. A final report on the work completed from 2006 to 2008 in the Tulks Volcanic Belt of central Newfoundland was released in 2011 and provides valuable information on the geology, metallogeny and key exploration results for this high-potential area. In eastern Newfoundland, John's work on sediment-hosted copper mineralization will be released as a geochemical data open file report. Also, he continues work on magmatic sulphide mineralization in central Newfoundland. John's 2012 field season was aimed at documenting the deposits and VMS potential of the Long Lake Belt, one of several arc-type volcanosedimentary sequences in the Victoria Lake Supergroup. Compared to other better-known sequences such as the Tally Pond belt and Tulks belt, Long Lake remains underexplored, but it does host known deposits with high Zn grades, as well as several well-developed VMS-type alteration zones.



Strong sericite pyrite alteration in felsic rocks at the tip of Long Lake Peninsula.

A report on the Pants Lake Intrusions of north central Labrador, based upon work by Andrew Kerr following the Voisey's Bay discovery has been published. This comprehensive report adds to results previously published in *Current Research* and external papers.

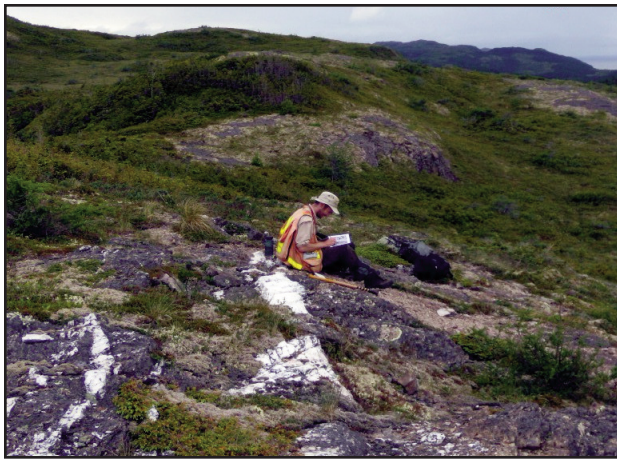
Research on Gold Mineralization

Exploration for gold remains high, due, in part, to its current high price. The most intense exploration activity is in central Newfoundland, but areas in western and eastern Newfoundland are also being explored.

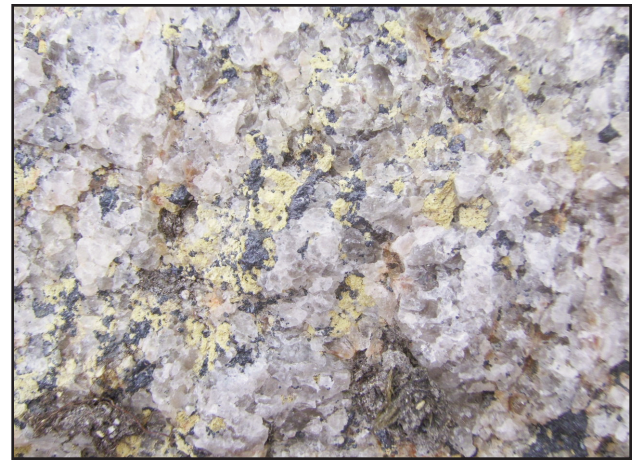
Hamish Sandeman continued field work on gold metallogeny and new gold discoveries mainly in the central Newfoundland region but also elsewhere in Newfoundland. Related laboratory investigations include U–Pb and Ar–Ar geochronology, fluid inclusion studies, lithogeochemistry and image analysis using SEM/MLA (scanning electron microscope/mineral laser ablation) methods. Reports published in *Current Research 2012* summarize results from the Viking Deposit in the White Bay area (part of a thesis research project by **Matthew Minnett**) and also the Reid deposit area of central Newfoundland. In both areas, Ar–Ar geochronological data point to a late Silurian age for gold mineralization. This work is partly integrated with scientific research underway at Memorial University with funding from the Research and Development Corporation (RDC).

In 2011, a metallogeny project was started by Greg Sparkes in the Burin Peninsula and the western Avalon Peninsula to examine epithermal-style gold ± silver mineralization. Fieldwork continued in 2012 and an M.Sc. research thesis was started by his field assistant **Sarah Ferguson** of Memorial University, with support from RDC. High-grade gold mineralization was discovered by local prospectors in southern Burin Peninsula. This area, along with the Stewart Property, were studied this year.

The first Re–Os pyrite ages from gold deposits in Newfoundland were published in a *Mineralium Deposita* paper



Greg Sparkes conducting mineral evaluation of potential epithermal environments within the western portion of the Avalon Zone.



Coarse magnetite and fergusonite in a pegmatite, southeast Labrador (fergusonite is Y-Nb oxide).



Sarah Ferguson collecting field data as part of an ongoing M.Sc. study of epithermal mineralization within the western Avalon Zone.

by Andrew Kerr and **David Selby**. In addition to providing more evidence for a late Silurian gold-mineralizing event, these results highlight the potential of this method in research on epigenetic mineral deposits.

Research on Rare-Earth Elements (REE) and Related Mineralization

No new field work on REEs was completed in 2012, but **Andrew Kerr** continued research work on material collected in previous years, including archived drill core from the Strange Lake Main Zone deposit, a large potential REE resource presently located within Exempt Mineral Lands (EML). The objective is to develop a better understanding of deposit geology, and eventually improved resource estimates focused on the REE.

Geochemistry, Geophysics and Terrain Sciences

The Geochemistry, Geophysics and Terrain Sciences Section (**Martin Batterson**, Senior Geologist) covers a range of geoscience, including aggregate resource assess-

ments, till- and lake-sediment geochemical surveys, surficial geology and ice-flow mapping, geophysical compilations and interpretation and environmental geology, specifically coastal erosion studies and geological hazard mapping.

Quaternary Geology

In central Newfoundland, **Jennifer Smith** focused on surficial mapping of the Noel Paul's map area (NTS map area 12A/9), plus infill till-geochemistry sampling of the Snowshoe Pond, Lake Ambrose, Star Lake, Badger, Dawes Pond, and Springdale map areas (NTS map areas 12A/6, 10, 11, 16; 12H/1, 8). This is the continuation of a multi-year project that began in 2007. Eight hundred and one sites were accessed by truck, ATV or helicopter, and 849 till samples were collected.

The surficial geology of NTS map areas 12A/9, 12A/16 and 12 H/1 is dominated by thick deposits (>2 m) of locally derived diamicton which form till blankets and areas of hummocky terrain. Bedrock is most commonly exposed in NTS map areas 12A/7 and 12A/11. Glaciofluvial deposits



Crosscutting striations in the Red Indian Lake basin. This bedrock exposure shows evidence for three separate ice flow events.

are rare and are found in the valley floors adjacent to larger rivers and brooks. Glaciolacustrine sediment is exposed in a few areas. These sediments were likely deposited in a small ice-marginal pond that formed during deglaciation. The remaining areas are dominated by exposed bed-rock (large parts of NTS map areas 12A/7 and 12A/11) or organic deposits.

Sixty new striation measurements were collected in 2012. Of these, 8 were multi-directional from which relative age relationships were determined for 7. These new striation data are similar to those of previous researchers and are consistent with the regional ice-flow trends.

In July 2012, **Denise Brushett** and David Taylor conducted surficial geological mapping and till geochemistry sampling on Fogo Island and Change Islands (NTS map area 2E/9). This project filled in a gap that remained in northeast Newfoundland following the completion of a multiyear till geochemistry and surficial mapping program that started in the area in 2009. Fifty-five samples were collected from the C- or BC-horizons of hand-dug pits. Eight new striation sites were recorded and indicate that the area was affected by northeastward and northwestward ice flow; however, no consistent age relationship was observed in this area.



Esker sampling in western Labrador in support of a kimberlite exploration project.

In August 2012, Denise conducted a 3-week reconnaissance project in western Labrador (NTS 23G, 23H, 23I, and 23J) sampling for diamond-indicator minerals to detect if diamondiferous kimberlite and lamproite rocks may be present in the area. The focus was in areas underlain by the Archean Ashuanipi Complex of the Superior Province, to the west, and the Middle Paleoproterozoic Churchill Province to the east.

David Taylor continued to coordinate the integration of digital maps with the on-line Geoscience Atlas. Two new 1:50 000 digital surficial geochemistry maps have been

added to the Geoscience Atlas on the Survey's website, bringing the total to 102 for the Island of Newfoundland and 38 for Labrador. The digitizing of aggregate potential maps that were previously only available as paper maps also continued with 211 maps completed to date. Similarly, till geochemistry, ice flow, surficial landform and aggregate resource databases have all been updated to include the most recent data available. In addition, David continued to work on the Avalon Peninsula till geochemistry project.

Aggregate Resources

Jerry Ricketts conducted a granular-aggregate resource assessment project in the Clarenville area (NTS map areas 2C/4 and 2D/1). Most of the sand and gravel samples collected were from sites located by air photo interpretation prior to the field season.



An esker ridge near Clarenville. Eskers are composed of sand and gravel, and are commonly a good source of granular aggregate.

Several large deposits of sand and gravel were identified in the survey area. Based on field observations, most deposits consist of sandy gravel and very sandy gravel aggregate. Some deposits have active quarries, some are located in areas where quarrying is restricted (e.g., watershed areas), and others are too far from road networks to make aggregate extraction feasible. Two small, previously unmapped esker deposits were sampled near Clarenville.

Geochemical Studies

John McConnell is primarily engaged in writing reports on geochemical surveys and making previously inaccessible data available on the Geological Survey's online Geoscience Atlas. Recently, John has prepared, together with Chris Finch, a report entitled "New ICP-ES Geochemical Data for Regional Labrador Lake-sediment and Lake-water Surveys". The report includes new data for 30 elements analyzed by ICP-ES performed on over 19 000 Labrador lake-sediment samples. Symbol-plot maps of these elements will be included as well as an expanded regional database that will also include the original analyses. The report will be released in the Fall of 2012. John is presently working on soil and stream sediment data from the Island of

Newfoundland collected in surveys in the early 1980s and which are not currently available in digital format.

Steve Amor spent the summer completing Open File reports on the lake sampling programs from 2009, 2010 and 2011, and analyzing till clasts (from the 2010 sampling program) with the aid of the new portable XRF device, as part of an attempt to identify the source of some interesting geochemical anomalies in the tills. Although these anomalies were primarily of rare-earth elements, analyses of the till heavy-mineral concentrates earlier in the year (released as an Open File in July) indicated the possible presence of previously unknown gold mineralization in the Bay de Verde Peninsula, and in central Newfoundland south of Millertown.

Steve also released an Open File entitled “A Filtering Technique for Identifying Local Maxima in Regional Geochemical Data Sets” which was presented as a poster at the GAC-MAC Annual Meeting in St. John’s in May.

Geophysical Surveys

Gerry Kilfoil continued to provide geophysical support to the mineral industry, as well as assuring that new geophysical data submitted to the department meet the required standards and formats. The index of airborne surveys, available through the on-line Geoscience Atlas, has been updated at intervals to include releases of airborne data flown by mineral exploration companies.

During the past year, the results of several detailed airborne geophysical survey programs, flown as part of mineral exploration programs have been released. **Robyn Constantine** has provided technical assistance by standardizing data formats and generating images from this new information as it gained non-confidential status.

In addition to new airborne surveys from the mineral exploration industry, the digital products from a large government-sponsored survey were made available via the on-line Geoscience Atlas: Phase III of aeromagnetic surveys (Shabogamo Lake Aeromagnetic Survey) was flown over the Ashuanipi Complex, immediately north of Labrador City/Wabush in western Labrador, in early 2011 as part of a multidisciplinary program (GEM), a joint federal-provincial mapping initiative between the Geological Survey of Canada, Géologie Québec and the NL Geological Survey.

Geological Hazards and Climate Change

Melanie Irvine continued studying coastal areas in Newfoundland and southern Labrador as part of the coastal monitoring program which began in 2011. The primary field objectives of 2012 were to establish new coastal monitoring sites to increase the geographic coverage of the program and to re-survey previous established coastal monitoring sites; fifty-three sites were studied. By re-visiting these sites over many years an assessment of rates of coastal erosion, changes in beach profiles and an identification of areas at



RTK surveying of a beach near Kippens, western Newfoundland.

risk from coastal erosion, slope movement and flooding will be identified.

Martin Batterson and **Neil Stapleton** (Geoscience Publications and Information Section) continued work on hazard mapping projects in the northeast Avalon Peninsula in support of regional municipal planning. Hazard vulnerability reports were completed for the towns of Conception Bay South, Portugal Cove–St. Phillips and Bauline; individual reports were provided to the respective communities for their input.

Geochemical Laboratory Services

The Geochemical Laboratory is located in the Howley Building, Higgins Line, St. John’s. It consists of four staff: Laboratory Director (**Chris Finch**) and Mineral Laboratory Chemists (**Anne-Marie Bourgeois**, **Krista Hawco** and **Lisa Connors**).

The laboratory carries out analysis for approximately 65 elements with an annual production of over 200 000 determinations. Most of the analyses for trace and major elements are carried out using Inductively Couple Plasma Emission Spectrometry. Other selective methods for LOI, FeO, Fluoride, Conductivity and pH are also used. The laboratory also maintains an archive of all samples collected by the Survey geologists that were submitted for analysis.

This past year saw the full implementation of the laboratories new ICP-OES and ICP-MS instruments. These instruments provide state-of-the-art technologies.

Regional Geology

The Regional Geology Section (**Alana Hinchey**, Senior Geologist) is responsible for all bedrock mapping in the province. There was one full field project carried out in 2012: Tim van Nostrand completed mapping the Seal Lake Group in Labrador. Bruce Ryan, Charlie Gower, Brian O’Brien, Ian Knight and Doug Boyce largely focused on data compilation, report writing and office-based studies with limited fieldwork to investigate specific geological relationships in their map

areas. Monica Squires recently transferred to the section and provides assistance to project geologists.

Brian O'Brien completed a new 1:25 000-scale geological map of the Indian River–King's Point area in west-central Newfoundland [NTS map area 12H/8, 9]. Underlain by rocks that formed between the Cambrian and the Carboniferous, the region has been affected by a protracted sequence of dynamothermal events that were separated, in time, by periods of sedimentation, volcanism, plutonism and mineralization. The area surveyed includes the numerous base-metal and gold prospects found in the type area of the Early Ordovician Catchers Pond Group.



Looking northwest from farmland underlain by Carboniferous sedimentary strata of the Southwest Cove sequence toward the white waterfalls on Rattling Brook. The steep cliffs in the background mark the trace of the regional Green Bay Fault.

Ian Knight continued geological studies of the lower Paleozoic platform of western Newfoundland focusing on two stratigraphic studies on the Port au Port Peninsula and in Gros Morne National Park, and revision of the geological map of the Bellburns area (NTS map areas 12I/5 and 6). Also undertaken was a systematic analysis of stratigraphic sections and trilobite collections of Watts Bight Formation limestone (basal St. George Group) on the peninsula. This was followed by systematic studies along Route 430 in the Gros Morne area that revise the local stratigraphic framework of the Labrador Group. Gently folded upper St. George and lower Table Head groups include extensive Daniel's Harbour dolomite, host to the Daniel's Harbour zinc deposit and the Trapper showing.

Doug Boyce, **Ian Knight**, **Lucy M.E. McCobb** (National Museum of Wales, Cardiff) and **Svend Stouge** (Natural History Museum of Denmark – Geological Museum) continue their collaboration on Early Ordovician fossils and carbonate rocks of western Newfoundland and North-East Greenland. Following up on the 2010 discovery of symphysuriniids, new macrofossil horizons (brachiopods, cephalopods, corals, echinoderms, gastropods, trilobites) were recorded in several sections of the Watts Bight Formation (St. George Group) along the south coast of the



Grenvillian basement (lower terrace) unconformably overlain by flay-lying Labrador Group sediments.

Port au Port Peninsula. The study of these fossils will fill a significant local gap in the understanding of the geological history of the Appalachian–Caledonian Orogen.

Tim van Nostrand completed the final field season of 1:50 000-scale bedrock mapping of the Mesoproterozoic Seal Lake Group in central Labrador, focusing on the western part of the group, north and east of the Orma Lake Road. Tim was aided by senior assistant **Chris Corcoran** and junior assistants **Daniel Niquet**, **Marina Scholfield** and **Sarah Turner**. The western Seal Lake Group is underlain by quartz-rich sedimentary rocks, basalt flows, volcaniclastic rocks and gabbro sills. Mineralization includes local bornite, chalcocite and chalcopryite associated with sheared contacts. A bedrock geochemical sampling program was carried out over the Michikamats syenitic ring complex. Prospecting and bedrock geochemical sampling were carried out over part of the Michikamau intrusion, where lake-sediment geochemical anomalies were indicated by a survey undertaken by Steve Amor in 2010.

Alana Hinchey is collaborating with **Christian Knudsen** (Geological Survey of Denmark and Greenland – GEUS) on a project to 1) investigate the orogenic development of



F1 fold in Seal Lake Group quartzite unit along unconformity with the Letitia Lake group.



Alana Hinchey and Christian Knudsen collecting fluvial sand and gravel samples and enjoying a summer's day on the beach in Baffin Island.

the landscape of northern Greenland, northeastern Nunavut and Labrador since the Cenozoic, and 2) to examine the subsequent weathering of the rocks and resultant processes of sediment transport and deposition into the adjacent Labrador Sea. Representative samples of fluvial sand and gravel from major rivers and intertidal zones, as well as representative bedrock samples were collected to determine the source and provenance of the continental shelf sediments. Analytical studies will be undertaken to characterize the age and nature of the sediments. These on-shore provenance studies will be utilized to finger-print distinct sediment sources that have fed the deep offshore basins in the Labrador Sea.

Monica Squires, with the assistance of **Sarah Furlotte** and **Adrienne Noftall**, has been processing the substantial paleontology collection housed at The Rooms Natural History Annex. Most of the 700 buckets and boxes of material have now been inventoried, and about 50 have been examined, prepared, documented and packaged for shipping or moved



Monica Squires archiving the paleontological collection at the Rooms.

into archival storage. This project is on-going and the final outcome will be the integration of the Geological Survey's paleontology collection and associated database with The Rooms Provincial Museum Division's permanent collection.

Charlie Gower's activities in the past 12 months are several. Apart from on-going database and report-preparation activities, highlights from the past 12 months include, i) leading a 6-day post-conference field excursion in eastern Labrador in early June for an international group of geologists as part of the Geological Association of Canada – Mineralogical Association of Canada Annual National Meeting, (ii) a 3-week visit to Guyana in mid-late June conducting a scoping mission on behalf of the Guyana Geology and Mines Commission, the purpose of which was to access present capacity and to make recommendations regarding future strategic direction for the organization; indirectly, this is part of a larger initiative with Newfoundland agencies to assist the Guyanese government in realizing its oil and mineral potential, and (iii) continuing a regional Nd isotopic mapping study (field investigations carried out in July) to determine the age of the Earth's crust in the Grenville Province in Labrador; this is being conducted in conjunction with McMaster University in Ontario.



Headquarters of the Guyana Geology and Mines Commission.

Geoscience Publications and Information

The Geoscience Publications and Information Section (**Sean O'Brien**, Senior Geologist) is organized around six principal lines of business. These focus on the communication of public- and private-sector geoscience and related mining-sector information to current stakeholders and future investors. The section currently has 18 professional, technical and clerical staff.

The section provides publishing, editing, design and cartographic support to Mines Branch, and oversees all aspects of the department's promotion of mineral exploration and development opportunities. Other responsibilities include liaison with the mining industry, public and private sector

geoscience documents and collections (Geofiles), geoscience outreach, prospector mentoring, and maintenance of client databases, publication inventories, and the Mines Branch area of the website.

Industry Information and Client Services

The Industry Information and Client Services group (**Phil Saunders, Randy Meehan** and **Stephanie Neary**) represents the initial point of contact for most clients of the GSNL, and for the Mines Branch in general. They provide information and consultation services to a broad client base including companies, prospectors, industry associations, other government departments and agencies (both federal and provincial) and the general public. The Information group has a close working partnership with the Matty Mitchell Prospectors Resource Room (see below) and with Geofiles staff. The group collectively handles a large volume of requests for information, help and advice made through office visits, phone calls and emails.

Phil Saunders became the Mineral Exploration Consultant in March 2012, and continues to provide information relating to mineral exploration investment decisions. He maintains a key role in industry liaison and in tracking exploration trends and activities, in support of promotional activities and to provide strategic advice to clients. In September 2012, he organized a tour of mines and advanced exploration projects in central and western Newfoundland for the *Canadian Mining Journal*. The article will be published January, 2013.

Promotion, Geoscience Marketing and Investment Attraction

This group has overall responsibility, within the Mines Branch, for a wide array of promotion and investment attraction initiatives designed to encourage growth in the mining and mineral-exploration sectors. The Mines Branch promotion program is the responsibility of **Carolina Valverde Cardenas**, Sean O'Brien and Phil Saunders. The group provides technical information on current exploration activity, geological context of exploration trends, opportunities for new project generation, and information on Mines Branch programs to support the industry.

In 2011-12, the group spearheaded the delivery of promotional initiatives at Mineral Exploration Roundup, PDAC, and Québec Exploration, as well as Mineral Resources Review, Baie Verte Mining Conference and Expo Labrador. Increasing exposure to Asia-Pacific markets and developing relationships in the region remains a priority for government. To this end, the group coordinated a China cultural training course delivered by the Department of Foreign Affairs and International Trade (DFAIT) to government and industry participants, hosted a MySteel iron ore trade mission to Canada, and a fact-finding mission by a delegation from the China Academy of Geological Sciences. More traditional initiatives included participation in Canada-China mineral forums and related events in Hong Kong, Beijing,



Delegation from the China Academy of Geological Sciences meeting with staff from the Publications and Information Section.

and Toronto, and at the China Mining conference and trade show in Tianjin. The recent Hebei-Alderon deal highlights the importance of these types of initiatives.

New web-based promotional initiatives targeted both traditional and emerging markets. The 'Explore Newfoundland and Labrador' area of the department's website was reorganized, and a new section was added to assist companies in promoting their advanced mineral exploration projects. The 'Asian Investment Initiatives' area of the website was expanded significantly, to encourage and facilitate industry participation in this area.

Publications and Cartographic Services

Publications and cartography includes editorial (**Chris Pereira** and **Des Walsh**), cartographic/GIS (**Dave Leonard, Tony Paltanavage, Terry Sears** and **Neil Stapleton**), and desktop publishing and design staff (**Joanne Rooney** and **Beverly Strickland**). They are responsible for report and map preparation and production for the GSNL, and provide cartographic, graphic design and desktop publishing services to other divisions and branches of the department, as needed.

In the past year, the section published in excess of 64 maps, final project reports, open file releases, and other documents



PDAC 2012

including the annual Current Research volume. It also assisted in production of joint GSNL–GSC open file releases of geophysical data collected under the GEM and TGI-4 programs. Staff provided graphic design and related cartographic support for trade magazines, a wide variety of branch presentations, for promotions and investment initiatives at mining trade shows, conferences and symposia, and for the outreach projects. Updates of the Mines Branch area of the website and the web-based release (timed and otherwise) of all GSNL publications are also handled by this group.

Geoscience Documents Collections and Databases

The Geofiles and Library collections, with related metadata, are maintained by **Catherine Patey**, **Cindy Saunders**, and **Paula Bowdridge**. The Geofiles collection consists of over 20 000 geoscience and mineral exploration documents relating to the province. Metadata describing the Geofiles are searchable online at <http://gis.geosurv.gov.nl.ca/minesen/geofiles/default.asp>.

The Geofiles collection includes over 10 000 non-confidential mineral exploration assessment reports. About 95% of these are available online as .pdfs. This year, the department started to receive and archive assessment files in digital-only format.

The Geofiles collection also includes Geological Survey (and predecessor organizations) publications dating from 1873 to the present. Metadata for these 4800 documents (including articles in volumes like Current Research) are searchable online. About 35% of these documents are also available online as .pdfs. Government web-use statistics indicate that during the past year over 470 000 .pdfs were downloaded and there were over 57 000 Geofiles metadata queries.

The group provides customized searches of the Geofiles, Library and various in-house databases, including company archives and also assists clients (in-house and by phone) doing their own online searching.

Outreach

Geoscience outreach and education initiatives are coordinated by **Amanda McCallum**. In 2012, the Geological Survey continued its delivery of educational programming thanks to continued partnerships with organizations such as the (PDAC) Mining Matters. The Mineral Resources Student Workshop Series in Labrador included visits to six communities on the north coast of Labrador, delivering interactive, hands-on workshops.

The Joint GAC-MAC Meeting in St. John's provided the platform to develop and coordinate education initiatives in partnership with EdGEO, a Canadian Earth Science Teacher Program. The activity-based, curriculum linked workshops and field trip, were attended by 38 teachers and more than a dozen geoscientist educators from across Canada.



Outreach Geologist, Amanda McCallum working with a group of teachers at the EdGEO Teacher Workshop.

For 2011-12, other collaborative initiatives included work with the Department of Tourism, Culture and Recreation, the Department of Innovation, Business and Rural Development, and local partners, on a geotourism project on the Bonavista Peninsula. The GAC-MAC Annual meeting also saw the delivery of a special session devoted to geological heritage with a day-and-a-half of talks from local, national and international speakers. The session was followed by a three-day field trip to the Bonavista Peninsula.

Mineral and mining resources outreach involves a partnership with the CIM Newfoundland Branch, Mining Industry NL and PEGNL on coordinating Provincial Mining Week. Events include the delivery of the fourth annual Women in Mining Forum and the Inuit Carving Demonstration.

Matty Mitchell Prospectors Resource Room

The Matty Mitchell Prospectors Resource Room supported and mentored a large number of prospectors from Newfoundland and Labrador during the past year. The Resource Room provided varying levels of technical support that helped in the discovery and advancement of prospects, managed by prospectors. This project is overseen by a joint government–industry committee chaired by Sean O'Brien. Resource Room Geologist, **Pat O'Neill**, is responsible for the daily operation of the project. The Resource Room is a private–public partnership with funding and in-kind support provided by the Mines Branch and Mining Industry NL.

In 2012, the Resource Room played a major role in assisting prospectors at Mineral Exploration Roundup, PDAC and Mineral Resources Review. Paper and digital posters were developed by Pat O'Neill to help prospectors promote their properties at these events. The booklet, maps and CDs containing information on "Properties Available for Option in Newfoundland and Labrador" were updated in 2012 and is also available on the Matty Mitchell website (www.nr.gov.nl.ca/nr/mines/pro prospector/matty_mitchell/index.html)

The Resource Room continues in its collaboration with the Mineral Incentive Program. Prospectors without grants can avail of funding to have promising mineralized samples assayed. In addition, the Resource Room continues its participation in the annual prospector's training course in Stephenville. The Resource Room also continues its prospector training and outreach initiatives in support of Regional Zone Boards with the delivery of a prospector workshop in Baie Verte. The Resource Room also participated in the first AGM of the new 'Newfoundland and Labrador Prospectors Association' (NLPA) in Gander with a display of promotional material, literature and rocks.



Stephenville Prospectors course, 2012.

MINERAL DEVELOPMENT DIVISION

The division is responsible for both the technical and economic analysis of the mining industry and its commodities in the province, as well as the monitoring and analysis of all phases of individual mining and quarrying operations. This is the key division for liaison with other federal and provincial government departments on mining matters. The division administers the Mineral Incentive Program. **Alex Smith** is the Director of the division.

The division has maintained a consistent level of staffing during this past year. It has a long term vacant position of Mineral Development Engineer that remains unfilled because of a lack of qualified applicants.

The division continues to emphasize awareness of occupational health and safety requirements for field personnel. Training has taken place in safety related courses such as First Aid, CPR, and fall protection.

Operations

The division is responsible for administering the Mining Act, and thus ensuring that mineral resources are responsibly developed and that end-of-life operations are properly

closed down and monitored. It is also responsible for rehabilitating legacy, orphaned and abandoned mines to ensure they do not present safety hazards.

The division encourages the development of the province's mineral resources by providing training and financial assistance to prospectors and junior exploration companies under the Mineral Incentive Program. It also provides advice to all provincial and federal government agencies that provide support or assistance to mining projects. Staff liaises with industry by attending technical conferences, trade shows and investment seminars.

The division's activities are organized into three sections by major work functions: Engineering Analysis, Mineral Industry Analysis and the Mineral Incentive Program.

Engineering Analysis Section

The Engineering Analysis Section is responsible for administration of the Mining Act and inspection of current mine operations for compliance with the Act. The staff evaluates and reviews development plans, rehabilitation and closure plans and financial assurance proposals for proposed mining operations as well as modifications/updates for existing operations. This past year, development and/or rehabilitation and closure plans have been reviewed or are under review from Teck Duck Pond Operations, Trinity Resources Ltd., Vale Newfoundland and Labrador Limited, IOCC, Tata Steel Minerals Canada, Anaconda Gold, Canada Fluorspar and Beaver Brook Antimony. For every active mine project, annual reports on the past year's operation, and operational plans for the current year, are reviewed. We strive to perform inspections of each active site twice yearly.

Orphaned and Abandoned Mines

The section also manages the orphaned and abandoned mines in the province.

In 2012, Dam Safety Reviews were completed at three orphaned and abandoned mines located in central Newfoundland; these are the former Gullbridge, Rambler and Whalesback mines. The reviews were recommended after dam safety inspections revealed potential dam stability concerns. The recent work involved geotechnical drilling



Haul truck BBAM Mine portal.



Rehabilitation of IOCC's Leila Wynn dolomite mine is expected to begin this year.

and sampling through each of the dams and stability analysis of dam sections. The studies resulted in recommendations for necessary repairs and design of dam rehabilitation work at each of the former mine sites.

Work on the dam at the Gullbridge mine site was given the highest priority and a contractor will start repair work on this dam in October. The rehabilitation work involves the construction of a 5 by 5 m rock-filled toe berm along the 1 km length of the dam, replacement of culverts and construction of an emergency spillway.

Work continues with the development of a GIS-based database on the orphaned and abandoned mines. The database will allow the division to rank the risk associated with each of the orphaned and abandoned mine sites, based on selected criteria and to visually represent the criteria in relation to the site locations. Further development of the database will continue as funds become available.

Julienne Lake Deposit

The Julienne Lake iron deposit is a Crown property (Exempt Mineral Land) in western Labrador. A \$2.6 million exploration program undertaken by the provincial government in 2010 has shown the Julienne property to be a significant iron ore deposit that might attract interest from industry. In October, the government announced a call for Expressions of Interest in the property. Those companies that qualify will be invited to submit a proposal detailing how the deposit will be advanced to mining, while maximizing the



Julienne Lake EML a significant iron deposit



Copper concentrate being loaded at Voisey's Bay.

benefits to the province. The section (**Brad Way** and **John Clarke**) is providing technical support as the department goes through the process of disposing of this property.

Mineral Industry Analysis Section

The Mineral Industry Analysis Section is responsible for economic and business research, Mines Branch statistical and analytical functions, and the development and co-ordination of policy and program matters related to the mining industry. This section publishes 'Mining in Newfoundland and Labrador' three times a year and the brochure 'MINFO' annually. A mineral statistics database is maintained that includes value of mineral shipments, employment, and exploration expenditures. The value of mineral shipments for 2011 is estimated at \$4.6 billion and the 2012 value is forecast to be \$4.1 billion.

Mineral Incentive Program

The overall budget for the Mineral Incentive Program is \$2.5 million for 2012-13. The table below compares the spending by program from 2010-11 to the present.

The number of prospector grants and the total amount projected to be spent on Prospector Assistance are on par with the numbers seen in recent years.

Program	2010-11	2011-12	2012-13 (projected)
Prospector Assistance			
Number of grants	80	85	85
amount	\$400 000	\$400 000	\$450 000
Natural Stone			
Number of grants	4	0	0
amount	\$125 000	\$0	\$0
Junior Exploration			
Number of grants	24	25	20
amount	\$2 375 000	\$2 500 000	\$2 100 000
Prospecting Schools			
Number	1	1	1

There were 25 applications for assistance under the Junior Exploration Program; this is down from 37 the previous year and reflects recent adjustments seen in the commodities market that have led to a minor slowdown in exploration activity and a change to the application process that restricted the application period to only during two separate 24 hour periods. The 25 applications received exceeded the program budget for 2012-13. It should also be noted that this year's number of applications for JEA are in line with historic levels.

A two-week prospector training course was held in Stephenville; interest levels were such that no course was offered in Labrador in 2012. It is anticipated that field visits to prospector and junior company work-sites will be the focus for the autumn, and the final proposals for assistance will be assessed.

The Auditor General's Office performed a review of MIP in 2012. There were concerns identified regarding documentation of the application and project review process and the practice of retroactively funding projects. The department is implementing measures to address the AG's concerns and reviewing its current practice of retroactively funding exploration projects taking into consideration the objectives of the Mineral Incentive Program and alternatives available to ensure that incentive grant money is fully used.

MINERAL LANDS DIVISION

The Mineral Lands Division is responsible for the essential regulatory functions and information services that contribute to orderly and sustainable development of the province's mineral resources. These include administration and management of mineral-land tenure, quarry materials and mineral-exploration permitting, retrieval and storage of core from exploration drilling sites, and monitoring the type and amount of exploration activity in the province. The division has extensive contact with other departments and levels of government through referrals for various permits and approvals, and represents the Mines Branch on the Interdepartmental Land Use Committee. The Director of the Mineral Lands Division is **Jim Hinchey**.

Mineral Rights Section

The Mineral Rights Section (**Laurie Hennessey, Heather Rafuse, Stephen Hinchey, Andrea Mills, Justin Lake, Charles Newhook, Julie Hynes and Brenda Lynch**) administers all aspects of the acquisition, maintenance and regulation of mineral rights in the province. Many of these functions are performed through the Mineral Rights Administration System (MIRIAD). MIRIAD provides full time, online, map-based claim staking. It integrates mineral rights information with the province's geographic information and financial management systems.

Mineral rights are also managed through several key hard-copy registries that record transfers, confidential agreements, mineral licenses issued, and mining and surface leases; these consist of over fifty volumes of documents. They are extensively used by the legal community as well as by mineral exploration clients. To make these registries more accessible, a project (the Registry Project) was started in 2008, with three stages, as follows:

- Stage 1. Scanning of the historical registry documents and the collection of metadata: 7000 folios have been scanned and verified, to date,
- Stage 2. Development of an internal automated mechanism of maintaining registry data, and
- Stage 3. Development of web-based tools to allow the public to search and retrieve registry documents.

It is anticipated that Stage 1 will be completed by the end of 2012; Stages 2 and 3 are contingent upon IT funding approval and could be completed in 2013 or 2014. The completion of this project will result in improvements in the internal business operations of the registration process and in client services, particularly to the legal community. It will also provide data protection as electronic documents will be backed up regularly, and copies stored offsite.

The Historical Mineral Tenure Project, started about 5 years ago, is scheduled to be completed by mid 2013. This involves the creation of digital files for all historical mineral lands, including ground- and map-staked licenses, fee simple mining grants and concession lands. Once this information is uploaded to the department's website, clients will be able to retrieve historical claims information and review any associated mineral exploration assessment reports remotely.

The section also monitors exploration activity and related expenditures in the province. Expenditures are surveyed annually in cooperation with Natural Resources Canada. The results are analyzed internally and reported to various branches of government and other agencies, and cited in many industry publications.

Quarry Materials Section

Quarry materials literally form the foundation for all other developments in the province. The administration and management of quarry materials are challenging as a result of increasing land-use conflicts, and environmental and social concerns.

The Quarry Materials Section (**Fred Kirby, Ges Nunn, Gerald Kennedy, Joanne Janes, Kirby Way and William Oldford**) is responsible for administration and enforcement of the Quarry Materials Act and associated regulations. The section is also responsible for the review of all municipal



MCreek, Jacksons Arm, summer 2012.

plans to ensure these do not have a negative impact on the mineral and aggregate resources of the province.

There were 1750 quarry permits and 84 quarry leases issued in the province in 2011 with a total reported production of 4 250 126 m³. As of September 27, 2012, inspection staff have completed 1180 inspections, issued ten stop-work orders and charges are pending on two cases of illegal quarry activity. Two charges of illegal quarry activity laid in 2011 resulted in convictions and in each case fines were imposed by the courts.

To decrease the turnaround time of quarry permit referrals, enhancements are being made to the Quarry Management System to allow all quarry referrals to be sent via email and for responses to be received in the same manner.

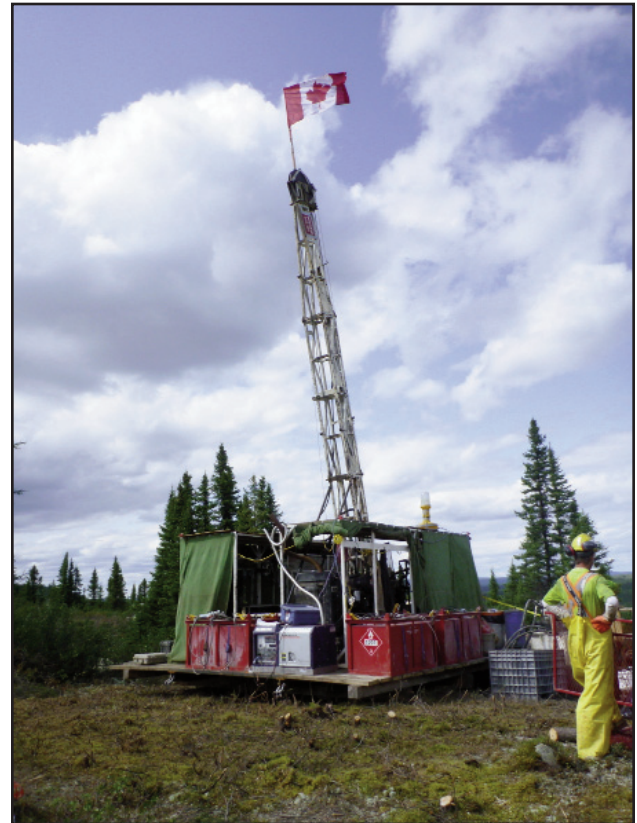
Core-Storage Program

The Core-Storage Program, formerly managed by **Alvin Harris** and with the assistance of **Stewart Cochrane**, operates six core-storage libraries located throughout the Province. Alvin Harris retired at the end of August and the position remains vacant. The core libraries house more than 1.29 million metres of drill-core samples from 9588 drill holes collected from various exploration projects located in the province. Samples are available for inspection by interested parties and are used extensively by the mineral exploration industry. Sampling of core is permitted, where sufficient core is available to allow removal of some material and with the proviso that all unused material is returned to the core library along with copies of analytical results.

The core-storage database is available on-line via the GeoScience Atlas.

Exploration Approvals

All exploration work requires Exploration Approval and this involves a referral process whereby certain government and



RioTinto LabIron, July 2012.

non-government agencies must be notified of work intent and are given the opportunity to provide feedback. **Heather Rafuse** administers the Exploration Approvals process and, to date, there have been 226 applications processed in 2012, compared to a total of 293 by year-end in 2011.

Exploration site inspections are conducted on a full-time basis and companies are advised to be diligent in following all regulations and conditions governing their exploration approvals. Exploration Site Inspector **Stephen Hinchey** completed on-site inspection of 65 exploration project sites by mid-September with inspections ongoing into the fall. Of the 65 project sites inspected, 20 are historical sites inspected to document ground conditions and natural re-vegetation in areas disturbed during past exploration activity.

The on-line Mineral Exploration Approval Management System (MEAMS) is in the final stages of development. MEAMS has two GIS-supported components: an on-line application for mineral exploration approval and an in-house database. MEAMS will be the single on-line portal for all permitting required by any exploration program and will enable quicker turnaround times for all permits and approvals for mineral exploration. The MEAMS system is scheduled to be available online to the public by mid-2013.

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