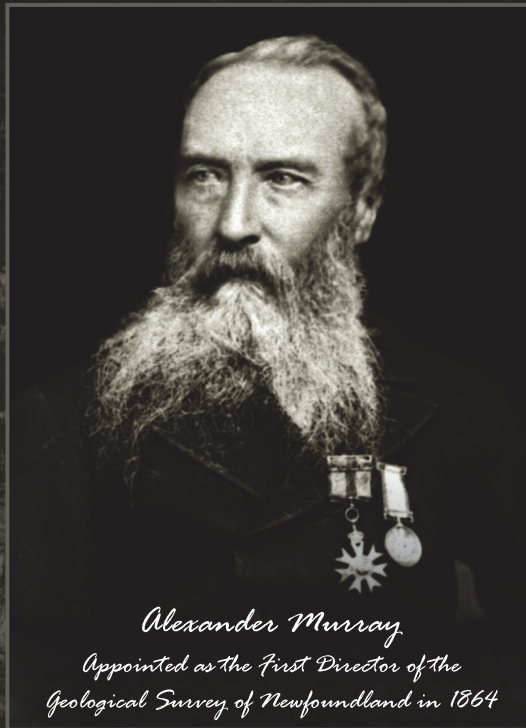


REVIEW 2014

Newfoundland
Labrador

Natural Resources



Alexander Murray
Appointed as the first Director of the
Geological Survey of Newfoundland in 1864

Celebrating
150 years
of research, discovery and development

Fitt Cove: Newfoundland's first major mining venture, opened in 1864. (from an 1872 engraving by B. Kroupa)

DEPARTMENT OF NATURAL RESOURCES

Hon. Derrick Dalley	Minister	729-2920	DerrickDalley@gov.nl.ca
Charles Bown	Deputy Minister	729-2766	cbown@gov.nl.ca
David Liverman	Assistant Deputy Minister	729-2768	dliverman@gov.nl.ca
Walter Parsons	Executive Director - Iron Ore	729-6760	walterparsons@gov.nl.ca

MINERAL DEVELOPMENT DIVISION

Director's Office

Alex Smith	Director	729-6379	asmith@gov.nl.ca
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Mineral Industry Analysis Section

Tony Burgess	Manager	729-6445	tonyburgess@gov.nl.ca
Bernie Brazil	Clerk-Typist III	729-6380	berniebrazil@gov.nl.ca
Llewellyn Higdon	Mineral Industry Analyst	729-6409	llewellynhigdon@gov.nl.ca
Bernadine Lawlor	Mineral Industry Analyst	729-6940	bernadinelawlor@gov.nl.ca
Keith Bradbury	Mineral Industry Analyst	729-5811	kbradbury@gov.nl.ca
Gord Button	Mineral Industry Analyst	729-5830	gordbutton@gov.nl.ca

Mineral Incentive Program

John Clarke	Manager	729-5851	jclarke@gov.nl.ca
Sharon Tracey	Clerk-Typist III	729-6405	sharontracey@gov.nl.ca
Dale O'Reilly	Geologist I	729-6448	daleoreilly@gov.nl.ca
		1-855-729-6448	

Engineering Analysis Section

Len Mandville	Manager	729-6439	lenmandville@gov.nl.ca
Abigail Steel	Mineral Development Engineer, Environment	729-6449	abigailsteel@gov.nl.ca
Paul Philpott	Mineral Development Engineer	729-2358	paulphilpott@gov.nl.ca
Muhammad Qureshi	Mineral Development Engineer	729-4408	muhammadqureshi@gov.nl.ca
Darren Pittman	Mineral Development Engineer, OAM	729-6512	darrenpittman@gov.nl.ca
Brad Way	Geologist III	729-1582	bradway@gov.nl.ca
David Tite	Financial Officer	729-7657	dtite@gov.nl.ca

MINERAL LANDS DIVISION

Director's Office

Jim Hinchey	Director	729-6425	jimhinchey@gov.nl.ca
Anne Marie Woolridge	Clerk Stenographer III	729-2773	annemariewoolridge@gov.nl.ca

Exploration Approvals and Inspections

Heather Rafuse	Geologist	729-6408	heatherrafuse@gov.nl.ca
Matthew Snow	Geologist	729-5634	matthewsnow@gov.nl.ca
Vacant	WPEO		

Mineral Rights Section

Justin Lake	Manager	729-6437	justinlake@gov.nl.ca
Stephen Hinchey	Project Geologist	729-5748	stephenhinchey@gov.nl.ca
Charles Newhook	Geological Technician	729-4020	charlesnewhook@gov.nl.ca
Laurie Hennessy	Clerk IV	729-4697	lauriehennessy@gov.nl.ca
Trina Adams	Geologist	729-0573	trinaadams@gov.nl.ca
Brenda Lynch	Receptionist	729-6849	brendalynch@gov.nl.ca

Quarry Materials Section

Gerald Kennedy	Manager	729-6447	geraldkennedy@gov.nl.ca
Joanne Janes	Clerk IV	729-4044	jjanes@gov.nl.ca
Ges Nunn	Project Geologist	729-6418	gesnunn@gov.nl.ca
Kirby Way	Quarry Material Compliance Officer	686-2054	kirbyway@gov.nl.ca
William Oldford	Quarry Material Compliance Officer	292-4503	williamoldford@gov.nl.ca
Andrea Devereaux	Quarry Material Compliance Officer	729-6410	andreadevereaux@gov.nl.ca

Core Storage Program

Glen Penney	Project Geologist	729-5833	GlenPenney@gov.nl.ca
Chris Moran	Geologist	686-2054	chrismoran@gov.nl.ca

DEPARTMENT OF NATURAL RESOURCES

Mines Branch Review 2014

The Mines Branch 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 is facing weakening prices for many commodities, resulting in a decline in value of mineral shipments. Employment in the mining sector is forecast to decline slightly from 2013's all-time high as construction at the Long Harbour nickel processing plant approaches completion.

Mineral shipments and exploration expenditures will remain at very high levels. Gross value of shipments for 2014 is expected to be about \$3.2 billion, compared to \$3.6 billion for 2013. Mineral exploration expenditure is forecast to decline, reflecting global challenges for junior companies in obtaining financing.

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, mounting nine field programs (3 in Labrador, and 6 on the Island). New initiatives included surficial and till geochemistry in the Eastern Pond and Miquel's Lake area of central Newfoundland, deposit-level studies of uranium deposits in the eastern part of the Central Mineral Belt of Labrador, and detailed lake sediment and water sampling in southeastern Labrador. Partnerships with the Geological Survey of Canada continued to improve our geoscience knowledge in the province.

The Mineral Incentive Program continues to provide important financial support to junior exploration companies and prospectors; a total of \$1.9 million was allocated to this program in 2014–15. 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 the tailings dam at Gullbridge, putting in place a long-term solution following the collapse of the dam in 2012.

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. The Division also led changes to the *Mineral Act* to address issues relating to the 20-year limit on exploration licenses.

2014 has been challenging for the global mining and exploration industry but mining projects continue to progress in the province. The future remains promising with new mines or expansions in construction, or in advanced feasibility studies; and other mines returning to production after hiatuses. Mining will continue to be 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 Labrador Trough. Work continues to identify partners to advance this project, which has the potential to realize further benefits for the people of Newfoundland and Labrador.

David Liverman
Assistant Deputy Minister

GEOLOGICAL SURVEY

The 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 2014–15 programs of the Geological Survey of Newfoundland and Labrador (GSNL) directly address these goals, mainly through its field programs, publications, retention of qualified staff, and successful promotional activities. Budget 2014 awarded GSNL \$5.49 million.

More than \$1.4 million was allocated to field activities this year. In Labrador, there were three major projects. These are: 1) the continuation of a project to study the iron-ore deposits of western Labrador, focusing on the deposits east of Schefferville along the Labrador–Québec border; 2) deposit-level studies of several prominent uranium occurrences in the eastern part of the Central Mineral Belt; and 3) detailed lake-sediment and lake-water sampling in southeastern Labrador, which completes a sampling program in this region.

On the Island, six field projects included the continuation of projects examining: 1) gold metallogeny in central Newfoundland; 2) Ni–Cu and Fe–Ti–V potential of mafic intrusions in Newfoundland; 3) vulnerability to coastal erosion around Newfoundland; 4) bedrock mapping on the lower Paleozoic platform near Corner Brook and Gros Morne National Park, and 5) a detailed, regional bedrock mapping of the Bonavista Peninsula area, eastern Newfoundland. A new project is the surficial mapping and till geochemistry of the Eastern Pond and Miquel's Lake area of central Newfoundland.

Our geoscience outreach and education program focused on the development of a strategic outreach plan for the department, that will be implemented over the coming years.

Office-based research 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, stream and soil geochemistry projects; data and map compilation for inclusion in Geoscience Online, including bedrock, surficial, mineral occurrence and geophysical data; syntheses of the geology of eastern Labrador and the geology of parts of northern Labrador; bedrock geology mapping of the Mesoproterozoic Seal Lake Group, and of uranium occurrences in the Central Mineral Belt of Labrador; till geochemistry of the central volcanic belt of Newfoundland; granular aggregate assessments of parts of insular Newfoundland, and geological mapping of the Buchans–Robert's Arm volcanic belt in central Newfoundland. Laboratory geochemical analysis of lake sediment and water, till and rock samples collected in 2014 continued using the Geological Surveys

ICP-ES and ICP-MS analytical equipment. In addition, updates to the Mineral Occurrence Data System are ongoing, as is the curation of the Geological Survey's paleontology collection at The Rooms.

The geoscience program employed 12 summer field- and office-support students. Most are enrolled in Earth Sciences or Geography programs at Memorial University. As well as assisting the GSNL, this employment with the Survey provides them 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 this year. Two long-standing members of the Geological Survey retired in the spring. Randy Meehan and Tony Paltanavage (Geoscience Publications and Information Section) each had careers spanning over 30 years with the public service, and each made tremendous contributions to the Geological Survey for which they should be duly acknowledged.

Joining the Geological Survey is Jennifer Kelly as a Mineral Laboratory Chemist to replace Krista Hawco who is taking a leave of absence, Marina Schofield as a Geologist I to replace Trina Adams who has been temporarily assigned to the Mineral Lands Division, and Shawn Duquet as a Project Geologist (Geoscience Data Management Section). In addition, Gillian Roberts (GIS Analyst) returned to the Geoscience Data Management Section, Kim Morgan (Cartographer) replaced Tony Paltanavage in the Geoscience Publications and Information Section, and Lisa Connors (Laboratory Chemist) returned to the Laboratory.

Linkages and Partnerships

The GSNL benefits through linkages and partnerships with other branches of government (provincial, national and international), with academic institutions 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 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 Business, Tourism, Culture and Rural Development, the Geological Survey is helping to develop the province's geotourism potential, as well as continuing work on the province's paleontological and other associated 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 with the Department of Environment and Conservation and the Office of Climate Change and Energy Efficiency on issues related to climate change, and provides advice to Fire and Emergency Services - NL and also to the departments of Transportation and Works, and Municipal and Intergovernmental Affairs, 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 as part of the GEM, GEM2 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 Martin Batterson. 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 Stephen Amor), 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 office- and field-based programs, outreach, 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 development of its five-year plan for the period 2015–2020, a plan that will be discussed with our Technical Advisory Committee, which consists of representatives of the mineral exploration and environmental industries and academia, prior to its adoption.

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 are also responsible for maintaining 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.

Safety in the field is a prime concern of the Geological Survey, and every effort is made to eliminate accidents through training and awareness initiatives. The Geological Survey was once again recognised for its safety record by the AMEBC – PDAC "Safe Day Everyday" Award in 2013.

Geoscience Data Management

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.

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**. **Gillian Roberts** provides support to all projects as well as to various projects in other sections of the Survey. **Shawn Duquet** has recently joined the section as a project geologist tasked with the compilation of archived data.

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 (<http://gis.geosurv.gov.nl.ca/>) has been upgraded to a new platform, with new tools and layers. New tools in the Atlas include the ability to draw graphics and text on the map, more powerful search and query capabilities, download of geoscience data to different formats, download of raster layers, print-to-scale, and the ability to bookmark a specific map view and share this view with others. Many layers have been updated and new layers, such as detailed geophysics, have been added. All layers are active when turned on in the Contents. Information about all open layers is obtained by a cursor click on a feature. The subsequent Search Results window contains a 'Link' tool to view associated pdf reports, maps and databases for many more layers including Drill Core, Mineral Occurrences, Map Staked Claims, Historical Claims, Till Geochemistry, and Index to Bedrock Maps and Geochemical and Geophysical Surveys.

Mineral Deposits

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. The section also plays a role in resource issues related to aboriginal land claims, and protected areas/land-use discussions.

Mineral Occurrence Data System (MODS)

The MODS is a detailed database of mineral occurrences that incorporates public-domain information from mineral exploration and Geological Survey research reports. The MODS is managed by **Greg Stapleton** with the assistance of **Jan Smith** and **Trina Adams**. Trina is currently on secondment to the Mineral Lands Division, so MODS now has a new replacement staff member. We are pleased to welcome **Marina Schofield** to a short-term assignment in the project; she comes with a history of involvement in Labrador field work, and also in the organizational side of Mineral Resources Review. The MODS is continually updated using available public-domain records. During 2014, numerous NTS map sheets were updated, in part. Work on systematic updates for the Baie Verte Peninsula started in 2013, and continued in 2014. The MODS is accessible through the survey website and through the Geoscience Atlas. It is a real-time database; new or updated occurrences become available online within 24 hours after input. The online application was improved in 2014; users can now create a more extensive 'MODS for GIS subset' by downloading many more fields from each MODS data record. The MODS project also contributes to the preparation of mineral commodity series reports. The report on fluorite was completed and released in 2014, and the barite report is now in its final stages. New reports on silica and evaporite minerals (salt, gypsum, potash) are currently in the pipeline. These will complete the series of reports for commodities that have been mined in Newfoundland and Labrador, but work will continue on additional reports for commodities of future exploration interest. Planning is also commencing for a longer term project to develop thematic metallogenic maps for both parts of the province, with the conceptual objective of providing integrated digital product alongside hardcopy-on-demand.

Research on Iron-ore Deposits

A new research project on iron-ore deposits in western Labrador was implemented in 2012 and continued in 2014. This project is being carried out by **James Conliffe**. Labrador West is a world-class iron ore district, but there is limited scientific information on these deposits. Regional field work in 2014 was mostly completed in the areas east of Schefferville on the Labrador–Québec border, and also archived drill core from various areas was examined. This work concentrated on the exploration potential for high-grade (> 50% Fe) iron ore deposits outside the traditional mining camps in western Labrador. A review of the Sawyer Lake iron-ore deposit was published in *Current Research* 2014, and highlighted the potential for deposit types that were not previously exploited; the character and genesis of these is an important aspect of the research. Work on other deposits in the Menihek area, notably the Joyce Lake and Houston deposits, suggests that these have some similarities to Sawyer Lake and may represent different steps in a complex



Outcrop of taconite iron formation in western Labrador.



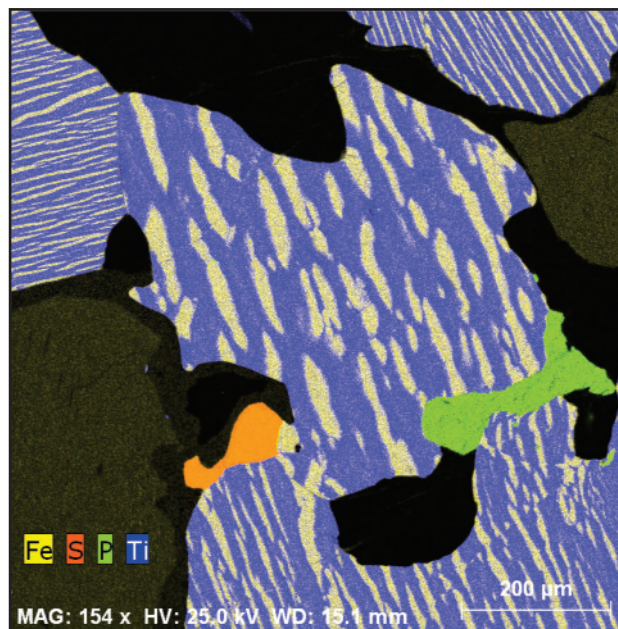
Tata Steel Minerals Canada Ltd. processing plant for DSO project, western Labrador.

sequence of hydrothermal alteration that upgrades originally lower grade sedimentary iron ores to > 50% Fe. The results of this comparative work will be included in a 2015 *Current Research* report. James also continues to provide technical advice related to the Julianne Lake iron ore deposit. In addition, he is contributing to a collaborative research project on magmatic Fe–Ti–V oxide mineralization in anorthosite suites, with Memorial University (Labrador Institute). Results from research were presented in an invited contribution at Québec Exploration 2013 and also at the annual Geological Association of Canada–Mineralogical Association of Canada Meeting in Fredericton, New Brunswick.

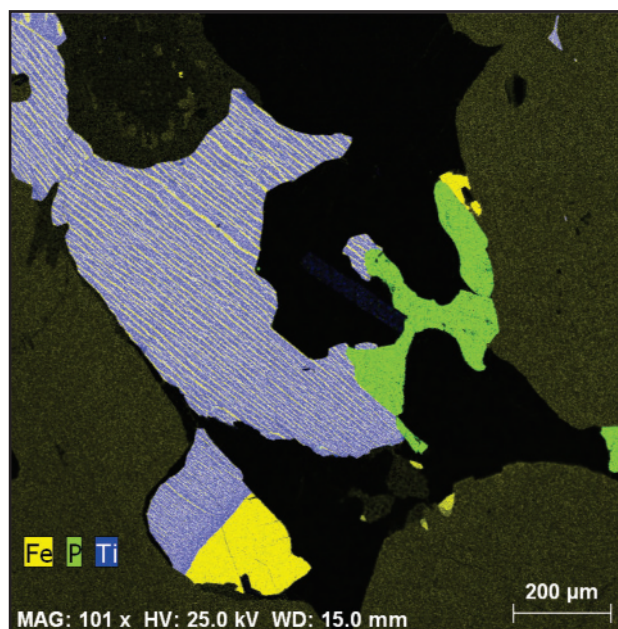
Research on Base-metal Mineralization

Research work related to base-metal mineralization in various parts of Newfoundland continued in 2014 under the direction of **John Hinchey**, and includes volcanogenic massive sulphide (VMS) deposits, and also Cu–Ni–Co min-

eralization and Fe–Ti–V mineralization of magmatic affinity. This year emphasized data compilation and synthesis, but brief field work was completed in central Newfoundland, focusing on the Long Lake Belt within the Victoria Lake Supergroup, and also re-logging drillcore from the Four Corners Fe–Ti–V project in western Newfoundland. Selective geochemical and geochronological sampling, also involving drillcore analysis, should clarify correlations and relationships amongst volcanic rocks of the Long Lake Belt, and connections with other VMS-prospective belts in the



Mineral liberation analysis image of oxide mineralizations, Four Corners property.



Mineral liberation analysis image of oxide mineralizations, Four Corners property.

Victoria Lake Supergroup. This work addresses questions raised in a report from *Current Research* 2014. Laboratory work, including SEM/MLA (scanning electron microscope/mineral liberation analyzer) and electron microprobe methods, was completed on samples from the Four Corners property and, in conjunction with petrographic and geochemical observations and interpretations, these data will form the basis of a *Current Research* article in 2015.

Research on Gold Mineralization

Hamish Sandeman continued research work on gold metallogeny and new gold discoveries mainly in the central Newfoundland region, but field work in 2014 was limited to short property visits and prospector support. Laboratory work included U–Pb and Ar–Ar geochronology, petrography, litho-geochemistry and image analysis using SEM/MLA (scanning electron microscope/mineral laser ablation) methods. This work is partly integrated with scientific research underway at Memorial University. Contributions in *Current Research* 2014 included discussion of geochronology and thermochronology studies from the Jaclyn gold prospect, and a summary of the new Staghorn prospect, including material from a thesis study sponsored, in part, by the Geological Survey. The plans for publication of research in 2015 include a current research article on geochemical studies of the Aucoin prospect, one of only a few known Labrador gold occurrences, and a more comprehensive report on the Jaclyn and related deposits in central Newfoundland. There was no field work on epithermal-style gold mineralization in eastern Newfoundland in 2014, although **Greg Sparkes** continues to be involved in an ongoing student research project by Sarah Ferguson at Memorial University.

Research on Rare-earth-elements (REE) and Related Mineralization

Andrew Kerr continued research on material acquired during earlier field work in Labrador, and is also working with the Nunatsiavut Government on mineral resource potential for Strange Lake and other areas or commodities. *Current Research* 2014 included an article summarizing new geochronological data from intrusive rocks in Labrador that host or have potential for REE mineralization, and also new geological information from the largely unexplored Mistastin Batholith. This area is a possible target for upcoming federal (Geological Survey of Canada) mapping programs, so this information, and possible follow-up geochronology, could prove very important. Analysis of archived drillcore from Strange Lake, and new material from other areas of REE mineralization or potential, continued through 2014, and geochronological studies of host granitic and volcanic rocks are ongoing. An assessment of thorium (Th) resources in the province is currently in progress; although the market is currently very limited, thorium is an energy mineral that could become important in future years. The most significant known resources are closely associated

with REE mineralization. Some work was also completed in conjunction with the Geological Survey of Canada (GSC) Targeted Geoscience Initiative (TGI) on granophile mineralization in southeastern Newfoundland; this includes a forthcoming paper highlighting new U–Pb geochronology data from many such host suites.

Research on Uranium Mineralization

Greg Sparkes continued his work on a comprehensive report on the regional geology of uranium in the Central Mineral Belt of Labrador, which is now expected to be published in 2015. He has also embarked on the second stage of this project, in which there will be a shift towards more focused, deposit-level studies of several prominent examples, such as the Michelin, Rainbow, Two-time and Moran Lake deposits. There is some expectation for increased uranium prices and exploration activity over coming years, so this is a good time to delve more deeply into the geology of this strategic mineral in Labrador. Many of the more detailed corporate research studies completed between 2007 and 2010 now also have public-domain status, so this is also an ideal opportunity to assess these results in a wider context. Field work in 2014 involved some work on archived drillcores in Goose Bay, but also renewed field work in several areas throughout the eastern Central Mineral Belt, and work with drillcore stored on site at several areas, including Moran Lake and Michelin. Paladin Energy has assisted with logistics for work in, and around, their project areas near Postville and Makkovik.



Assessing ground follow-up work on uranium prospect within the Central Mineral Belt of Labrador.

Other Research and Related Activities

In conjunction with Merline Fonkwe (Memorial University, Labrador Institute), the Mineral Deposits Section contributed to a research proposal that was funded by the Research and Development Corporation (RDC) to examine magmatic Fe–Ti–V oxide mineralization in Labrador. This study will largely focus on archived drillcore materials from previous projects on magmatic sulphides (Andrew Kerr) but may also involve some field contributions from James



Regional sampling of anomalously radioactive volcanic rocks of the Bruce River Group, Central Labrador.

Conliffe. Amongst other topics, the question of whether oxide geochemistry can be used as a discriminant to assess potential for Ni–Cu sulphide mineralization will be assessed. James Conliffe is also participating in a project with researchers at the University of Missouri to examine geochemical aspects of carbonate-hosted Pb–Zn deposits, including examples in western Newfoundland. Work in 2014 involved sampling of archived drill core for a wide-ranging transnational study. Greg Sparkes contributed to development of prospecting skills through local field trips associated with scientific meetings. The section was also involved in an exploration workshop funded by RDC and Anaconda Mining to develop new ideas for exploration targeting in areas around the Pine Cove gold mine. Andrew Kerr continued his involvement with the ‘Geology at the Edge’ program developed by the Shorefast Foundation of Fogo Island (now emerging as a popular geotourism destination) and also delivered an invited public lecture on the ‘Age of the Earth Controversy’ at the annual Geological Association of Canada – Mineralogical Association of Canada Meeting. Collectively, section members continued their involvement in a variety of more general projects, and play important roles in the local chapters of both the Geological Association of Canada (GAC) and the Canadian Institute of Mining and Metallurgy (CIMM).

Geochemistry, Geophysics and Terrain Sciences

The Geochemistry, Geophysics and Terrain Sciences Section (**Steve Amor, Senior Geologist**) covers a range of geoscience, including aggregate resource assessments; till- and lake-sediment geochemical surveys; surficial geological and ice-flow mapping; geophysical compilation and interpretation; and environmental geology, specifically coastal erosion studies and geological hazard mapping.

Quaternary Geology

Jennifer Organ completed a comprehensive synthesis of the till geochemistry of the Red Indian Lake Basin, which

was released August 2014, as OF012A/1562. Jennifer is currently working on the surficial geology and till geochemistry of the Dawe’s Pond, Sheffield Lake and Springdale areas, results from which will be available in the future.

Denise Brushett conducted surficial geological mapping and till-geochemistry sampling in the Eastern Pond and Miquel’s Lake areas (NTS map areas 2D/11 and 12) in the second year of a multiyear field program in south-central Newfoundland. The main field objectives were to collect samples for a regional till-geochemical survey, complete surficial mapping and reconstruct the glacial history of the area to support mineral-exploration activities. Through a combination of road-, ATV-, and helicopter-supported field work, 608 samples were collected from the C- or BC- horizons of hand-dug pits. Eleven previously unrecorded striation sites were recorded and indicate that the area has a complicated ice-flow history, and was affected by multiple ice-flow directions ranging from the northeast to the south. The lithology of clasts retrieved from glacial diamictons will also provide an indication of provenance.



Collection of a bulk till sample for indicator-mineral extraction.

Helicopter-supported till-geochemistry sampling, and surficial geological mapping were conducted in the St. Alban’s and Cold Spring Pond areas (NTS map areas 2M/13 and 12A/01). A bulk-till sampling project was also conducted in this area. Eight bulk till samples were collected to follow up on chromium and nickel anomalies found in lake-sediment data, and to better delineate and characterize a ribbon-shaped dispersal train in the area.

David Taylor continued to coordinate the integration of digital data with the on-line Geoscience Atlas. Two new 1:50 000 digital surficial geology maps have been added to the Geoscience Atlas on the Survey’s website, bringing the total to 107 for the island of Newfoundland and 38 for Labrador. New striation data collected during the 2014 field season is currently being edited and will be added to the striation dataset. Work continues on updating the Carbon-14 database with completion expected in 2015. Two new till-geochemistry open files (Fogo Island and Red Indian Lake

Basin) have been released with data being added to the online dataset, bringing the total number of records to 16 804. Similar updates, to include the most recent data, have been made to the aggregate resources and surficial landform datasets.

Geophysical Surveys

Gerry Kilfoil continued to provide geophysical guidance to the mineral industry, as well as assuring that new geophysical data submitted to the department meet the required standards and formats. **Robyn Constantine** provided technical assistance by standardizing data formats and generating images from recently released results of airborne geophysical surveys flown as part of mineral exploration programs. The index of airborne surveys, available through the on-line Geoscience Atlas, has been updated at intervals to include recent releases of airborne data flown by mineral exploration companies. When the new version of the Geoscience Atlas was released earlier this year, the geophysical content on the Atlas was significantly upgraded with the addition of high resolution images derived from large government-sponsored surveys from various parts of the province. We strive to improve the presentation and organization of this information within the Atlas menus. During the past year, we have also digitally captured the results of several older surveys from archived paper maps, as well as data listings not previously georegistered.

Geochemical Studies

As well as providing advice and assistance to the mining and prospecting community, **Steve Amor** has been investigating the potential of merging lake-sediment data from Labrador and the adjacent regions of Québec, compiling a comprehensive directory of untested lake-sediment anomalies in Newfoundland and Labrador, and streamlining the quality-assurance process for geochemical analyses. He also planned and supervised the lake-sampling program conducted by Jerry Ricketts in Labrador. This involved the collection of about 600 sediment and water samples on NTS map areas 13A/03, 13A/06, 13A/11 and part of 13A/14, and completes the detailed coverage, commenced in 2006, of a large area of southeastern Labrador whose geology suggests it to have enhanced mineral potential.

John McConnell will release a comprehensive open file report this fall, summarizing the results of a three-year geochemical survey over seven areas in southern Newfoundland. The report provides summary statistics of the geochemical data, correlation analyses of selected data, histograms, cumulative frequency plots, sample-location maps and symbol maps showing the distribution of most elements and other measured variables for sediment and soil samples. The symbols are overlain on maps showing drainage features and detailed-scale geology. Geochemical and field data for about 1100 stream-sediment, 950 soil and



Processing aeromagnetic data from the Buchans area.

235 rock samples were included in the report. The study demonstrates that stream-sediment and soil sampling are effective methods of delineating most known granophile (tin, tungsten and molybdenum) mineral occurrences in these areas. As well, several areas with anomalous stream-sediment and soil samples have been identified which suggest the presence of presently unrecognized mineralization.

Aggregate Resources

The overall objective of the granular-aggregate assessment projects (**Jerry Ricketts**) is to locate, map and sample all sand, gravel and sandy-till deposits that may be suitable as granular-aggregate resources for use by the construction industry. Results of this project will help road builders, contractors, consultants, and others to determine sources and quality of material available in a given area, and the distance to transport these materials to a specific job site.



Drying newly collected lake-sediment samples.

In 2014, work was mostly office-based, to continue updating aggregate maps from blueline to digital maps. To date, 214 maps have been digitized, and ten remain to be updated. These are expected to be finished by April, 2015.

Geological Hazards and Climate Change

Melanie Irvine continued working in coastal areas in Newfoundland and southern Labrador as part of the Coastal Monitoring Program. There are 110 monitoring sites in the province, of which 48 were monitored in 2014. In the summer of 2014, new sites were established at Witless Bay, Shoal Point, Boswarlos, Norris Point and Wreckhouse.

Coastal areas are dynamic, with rates of shoreline change varying between sites from a few centimetres to over a metre or more per year. Areas with rapid rates of short-term erosion include Sandbanks Provincial Park, J.T. Cheeseman Provincial Park, Point au Mal, Holyrood Pond, and Point Verde. Unconsolidated coastal areas are eroding due to waves, ground water, surface run-off, wind and rising sea levels. Severe storms, coinciding with high tides, have resulted in substantial erosion over a short period. Coastal monitoring sites will be repeatedly monitored over many years, and an assessment of rates of long-term coastal change will be quantified and areas vulnerable to coastal hazards delineated.



The shoreline at J.T. Cheeseman Provincial Park has eroded 8 m in the past year.

Laboratory Services

The Geochemical Laboratory of the Department of Natural Resources is mandated with the task of fulfilling all analytical requirements of the Geological Survey. The Geochemical Laboratory is located in the Howley Building, Higgins Line, St. John's, and has four staff: the Laboratory Director (**Chris Finch**) and Mineral Laboratory Chemists **Jennifer Kelly**, **Rosauro Roldan** 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 Coupled Plasma-Emission Spectrometry (ICP-ES) and Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). Other selective methods for LOI, FeO, Fluoride, Conductivity and pH are also used. This



The Mettler Toledo ion meter.

past year has seen the implementation of a fully automated Mettler Toledo ion meter. This provides automated determination and data capture of pH, conductivity, ferrous iron and fluoride measurements.

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 2014: Andrea Mills continued mapping in the Bonavista Peninsula area. Bruce Ryan, Charlie Gower, Brian O'Brien, Tim van Nostrand, 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 provides assistance to project geologists and is currently focused on a data management project dealing with the paleontology collection housed at The Rooms Natural History Annex.

Brian O'Brien completed a preliminary digital version of a 1:25 000-scale geological map of the middle portion of the Buchans–Robert's Arm volcanic belt in central Newfoundland [parts of NTS map areas 12H/01, 12H/08, 2E/04 and 2E/05]. The area surveyed includes numerous base-metal and gold prospects situated in several lithotectonic sequences. Mineralized strata of probable Early, Middle and Late Ordovician age comprise discrete units that are complexly distributed throughout the region.

Ian Knight and **Doug Boyce** continued geological studies of the lower Paleozoic platform of western Newfoundland, focusing on the Labrador Group. Sequences in southern Labrador, the Port au Port Peninsula, Goose Arm, Gros Morne National Park, St. Barbe and Canada Bay are being described in detail. This work comprises definition of the variable lithostratigraphy and depositional setting, as well as systematic taxonomy and biostratigraphy of the contained late Early Cambrian (Dyeran) to Middle Cambrian (Delamaran) trilobites. The Hawke Bay Formation in particular – previously thought to have been devoid of trilobites –



West-dipping sandstones at Cape Bonavista.



Ediacaran fossil, Charniodiscus, Catalina.

has yielded significant Delamarian faunas throughout western Newfoundland.

Charles Gower is in the final stages of his synthesis of the geology of eastern Labrador and is also providing input into various graduate student research projects addressing the region (Memorial University, Newfoundland; St. Andrew's University, Scotland; McMaster University, Ontario; Carleton University, Ontario; University of Witwatersrand, South Africa). An extensive supporting digital database for eastern Labrador is complete, except for minor updates and editorial input. Four of five students have now completed their theses (three at Ph.D. level). Gower's involvement has ranged from peripheral to in-depth, depending on the project.

Tim van Nostrand continued office-based compilations of Labrador field data. Most of this work included finalizing a synthesis of the geology of the Mesoproterozoic Seal Lake Group, focusing on completion of several 1:50 000-scale bedrock maps and interpretation of geochemical and

geochronological data. In addition, a preliminary compilation of the geology of the northeastern Archean Ashuanipi Complex in Labrador was completed, based on data collected during the 2013 field season. The results of a brief geochemical bedrock sampling project of parts of the Mesoproterozoic Michikamats and Michikamau intrusions in western Labrador were also compiled. The aim of this project was to survey three areas with elevated REE in lake sediment and water to examine the potential of these intrusions to host mineralization.

Andrea Mills continued a 1:50 000 scale bedrock mapping project on the Bonavista Peninsula (NTS map areas 2C/6 and 2C/11). This project complements recent regional bedrock mapping on the Peninsula and aims to generate an updated regional geological map of the region. The Bonavista Peninsula is underlain by Neoproterozoic siliciclastic rocks of the marine-dominated Conception Group to the east, and terrestrial-dominated Musgravetown Group to the west. Andrea is supporting a B.Sc. (Hons) thesis project by summer student Jesse Wilson (MUN). This project focuses on the petrography, geochemistry and geochronology of the volcanic rocks of the Bull Arm Formation, in the Summerville area.

Alana Hinchey continues collaborating with Christian Knudsen (Geological Survey of Denmark and Greenland – GEUS) on a project to determine the source and provenance of the continental shelf sediments. Other collaborative projects include working with the Department of Business, Tourism, Culture and Rural Development as well as with local partners on a variety of geotourism projects, including the Aspiring Discovery Geopark on the Bonavista Peninsula. In collaboration with the Geoscience Data Management section, Alana led the development of the first multi-platform app that highlights the building stones of St. John's.

Bruce Ryan is continuing compiling maps and a report covering his and Don James' work in the Nain area, as well as revising some previously published geological maps and, through consultation with Nunatsiavut government personnel, adding Inuit names for geographic features to all maps as appropriate. Along with Professor Aphrodite Indares, metamorphic petrologist at MUN, and graduate student Rhea Mitchell, a new study of ultrahigh temperature metamorphism in the Nain area was published in the Journal of Metamorphic Geology. Co-operative work was undertaken, along with Tim van Nostrand, with archaeologists from the Innu Nation and the Nunatsiavut government on identifying the composition of stone artifacts from prehistoric sites in central Labrador in an effort to pinpoint bedrock sources.

Monica Squires, with the assistance of summer students Zoë Goodyear and Emily Hartery, has continued processing

the substantial paleontology collection housed at The Rooms Natural History Annex. In the past year, approximately 50 buckets and 21 drawers of transitional material have been examined, prepared, documented and moved into permanent storage; all fossil material from Reluctant Head, Weasel Group, Cooks Brook, Watts Bight and Costa Bay has now been processed and archived. An essential component of this work is the new electronic collections management system being implemented at The Rooms, which is in the final stages of development and will incorporate Geological Survey data and functionality to improve access to the fossil collection and its associated data.

Geoscience Publications and Information

The Geoscience Publications and Information Section (**Sean O'Brien, Senior Geologist**) is organized around five 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 15 professional, technical and clerical staff.

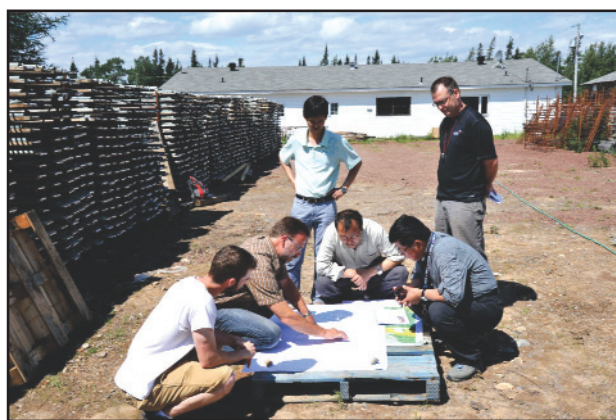
The section provides publishing, editing, design and cartographic support to Mines Branch, and oversees all aspects of the department's promotion of mineral exploration and development opportunities. Other responsibilities include liaison with the mining industry, management of public and private sector geoscience documents and collections (Geofiles), prospector mentoring, maintenance of client databases, client notifications, and overall responsibility for the Mines Branch website. The section regularly provides information and advice to other line departments concerning international investment and inter-governmental cooperation related to the mineral sector.

Industry Information and Client Services (Mineral Exploration Consultant)

The Mineral Exploration Consultant's office represents the initial point of contact for most clients of the GSNL, and for the Mines Branch in general. It provides 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 group has a close working partnership with the Matty Mitchell Prospectors Resource Room (*see below*) and with Geofiles staff. It collectively handles a large volume of requests for information, help and advice made through office visits, phone calls and emails.

As Mineral Exploration Consultant, **Phil Saunders** provides independent advice and information to clients relating to mineral exploration. He maintains a key role as industry liaison, tracks exploration trends and activities in support of promotional activities, and provides strategic advice to clients.

In 2014, as part of the promotional initiative, Phil helped organize and implement a field tour of Newfoundland VMS projects with the China Ministry of Land and Resources. He also met with several visiting Chinese mining company groups interested in investing in local exploration projects, and participated in the Department's investment attraction initiatives in China. Finally, he authored or co-authored articles on the mineral potential of the province for publication in the Canadian Mining Journal, and helped prepare and deliver various presentations on same.



Asian investment attraction initiatives: Chinese geological team visiting junior companies' VMS projects in central Newfoundland.

As part of his organizational role in Mineral Resources Review, Phil initiated a new feature (the Procurement Session) within the Service Providers Forum, in collaboration with colleagues in the Department of Business, Tourism, Culture and Rural Development. This session will highlight procurement processes in the mining sector.

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.

The group organized and delivered promotional initiatives at Mineral Exploration Roundup, PDAC, and Québec Exploration, as well as at local venues such as Mineral Resources Review, and the Northern Lights conferences. The group began a new collaboration with the Department of Business, Tourism, Culture and Rural Development (BTCRD) promoting opportunities in the mining supply sector at local mining conferences (Mineral Resources

Review, Baie Verte Mining Conference and Expo Labrador). It has also been collaborating with Executive Council and BTCRD on development of a new Mines Branch promotions pavilion, which will be launched at the new Xplor 2014 Conference in Montreal in October. Throughout the year, staff developed and updated a wide array of technical promotions materials. Many of these are also available in Mandarin and French.

Increasing exposure to Asia-Pacific markets and developing relationships in the region remains a priority for government. To this end, the group coordinated a week-long fact-finding mission on VMS by a delegation from the China Ministry of Land and Resources. Other initiatives included participation in Canada-China mineral forums and related events in Beijing, Shanghai and Toronto, and at the China Mining Congress & Expo in Tianjin and the Exploration Exchange China Conference and Exhibition in Beijing. The group collaborated with BTCRD and Mining Industry NL on many of the international investment attraction initiatives over the past year.

Web-based promotional initiatives continue to target both traditional and emerging markets. The 'Explore Newfoundland and Labrador' and the 'Asian Investment Initiatives' areas of the website (available in both English and Mandarin) were updated and expanded 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**, **Kim Morgan**, **Terry Sears** and **Neil Stapleton**), and desktop publishing and design staff (**Joanne Rooney** and **Bev 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 40 maps, final project reports, open file releases, and other documents 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 staff of the Geoscience Publications and Information Section (**Cindy Saunders** and **Paula Bowdridge**).

The Geofiles collection is a growing, digital and hard copy collection of private- and public-sector mineral exploration and geotechnical/geoscientific documents (currently 22 000+ items) relating to the province. Many of these documents are exclusive to this collection. Metadata describing the Geofiles are searchable online at <http://gis.geosurv.gov.nl.ca/minesen/geofiles/>.

The Geofiles collection includes over 10 000 non-confidential mineral exploration assessment reports. About 97% of these are now available online in .pdf format. The Mines Branch is now receiving and archiving most 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 nearly 5000 documents (including articles in volumes such as *Current Research*) are searchable online. About 45% of these documents are also available online as .pdfs.

In early 2014 a large number of maps were scanned by an external contractor. Most were government geological maps; some assessment file maps were also scanned. A second phase of map scanning is currently underway. Government web-use statistics indicate that between October 2013 and October 2014, 236 212 pdfs were downloaded and there were 36 496 Geofiles metadata queries. Geofiles staff provide customized searches of the Geofiles, Library, Pfiles and various in-house databases, and also assist clients (in-house and by phone) doing their own online searching.

Matty Mitchell Prospectors Resource Room

The Matty Mitchell Prospectors Resource Room is a private-public partnership with funding and in-kind support provided by the Mines Branch and Mining Industry NL. The 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.

Despite the downturn in the mining industry, prospectors from Newfoundland and Labrador continued to avail of the support and mentoring services from the Resource Room during 2014. Varying levels of technical support were provided that helped in the discovery, promotion and advancement of prospectors' properties.

The Resource Room played a major role in assisting prospectors at Quebec Mines, Mineral Resources Review (St. John's), Mineral Exploration Roundup (Vancouver) and PDAC (Toronto). Informative property posters were com-

piled to help prospectors promote their properties at these events. A booklet, maps and CDs containing information on “Properties Available for Option in Newfoundland and Labrador” were updated several times during the year and are available on the Matty Mitchell website www.nr.gov.nl.ca/nr/mines/pro prospector/matty_mitchell/index.html

In 2014, the Resource Room geologist participated in the annual prospectors’ training course in Stephenville and attended the annual Mining Conference in Baie Verte. He also attended the third Annual General Meeting of the Newfoundland and Labrador Prospectors Association (NLPA) with a display of promotional material, literature and rock samples.

The Resource Room continues in its collaboration with the Mineral Incentive Program, whereby prospectors without grants can avail of funding to have promising mineralized samples assayed free of charge. This service includes rock and mineral identification, and informal discussions about the geology and mineral potential of the particular area of interest. As in previous years, this arrangement has resulted in new mineral discoveries and subsequent claim staking.

MINERAL DEVELOPMENT DIVISION

The Mineral Development Division administers the *Mining Act* and is responsible for the approval of plans for the development, operation and closure of mines; development of mineral policy; monitoring and economic analysis of the mining industry; management of financial incentive programs for exploration; and management of orphaned and abandoned mines. This is the key division for liaison with other federal and provincial government departments on mining matters. **Alex Smith** is the director of the division.

Operations

The division is responsible for administering the *Mining Act*, ensuring that mineral resources are responsibly developed and that end-of-life operations are properly closed 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 provincial and federal government agencies that provide support or assistance to mining projects. The staff liaise with industry by attending technical conferences, trade shows and investment seminars.



Teck have completed mining of the Boundary open pit mine at the Duck Pond Operations site.

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

The Engineering Analysis Section is responsible for administration of the *Mining Act* and inspecting current mines for compliance with the Act. The staff ensures that all required plans are submitted and are in compliance with this legislation, and that operators are developing projects according to approved development plans. Despite the current market conditions, development of projects continues, particularly in the Labrador Trough – staff continue to work with companies as they advance their projects toward production. Another requirement under the *Mining Act* is to submit for review an annual report on the past year’s operations, and an operational plan for the coming year.

Engineering Analysis also manages the orphaned and abandoned mines in the province. Significant repair work was recently completed on the tailings dam at the former Gullbridge mine. Engineering Analysis staff will continue to monitor conditions at the site and work toward closure as funds are identified.

Design work for tailings dam repairs at the former Whalesback, Rambler Consolidated, and Buchans mine sites is ongoing, and construction is expected to take place during the summer of 2015. A dam safety review is being completed for the Minworth dam at the former St. Lawrence fluorspar mine.

Mineral Industry Analysis

The Mineral Industry Analysis Section is responsible for economic and market research; 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.



IOC drilling in preparation of blasting to reduce pit slopes during rehabilitation of the Leila Wynn dolomite mine.

A mineral statistics database is maintained that includes value of mineral shipments and employment. The value of mineral shipments for 2013 is estimated at \$3.6 billion and the 2014 value is forecast to be \$3.2 billion.

Mineral Industry Analysis often supports the Department of Finance's economic analysis by providing historic and forecasted metals prices and specific mining project advice as requested.

Mineral Incentive Program

The overall budget for the Mineral Incentive Program (MIP) is \$1.9 million for 2014–15. The table below summarizes the spending by program from 2012–13 to the present.

Program	2012–13	2013–14	2014–15 (projected)
Prospector Assistance			
Grants approved	68	53	63
Amount spent	\$270 059	\$227 667	\$342 175
Natural Stone			
Number of grants	0	0	0
Amount	\$0	\$0	\$0
Junior Exploration			
Number of grants	15	17	17
Amount	\$1 560 000	\$1 484 000	\$1 500 000
Prospecting Schools			
Number	1	1	1

The number of prospector grant applications is down slightly so far in 2014, but the total projected expenditures by the prospecting community is expected to remain constant. MIP continues to support prospector promotion through annual \$48 000 grants to Mining Industry NL to help fund



Mobile equipment parked at Cliffs Natural Resources' Wabush Mines.

the Matty Mitchell Prospector Resource Room, and for prospector travel to national conferences.

In late May, the annual two-week prospector training course was held in Stephenville. 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.

There were 27 applications submitted for assistance under the Junior Exploration Program; this is down from 32 the previous year and reflects the continued challenge for companies to raise capital and conduct exploration. Funding has been proportionately dispersed to all successful applicants from the first window when applications were accepted – May 16th.

Julienne Lake Deposit

The Julienne Lake deposit was made an Exempt Mineral Land (“EML” - meaning that the mineral rights are reserved for the Crown) in 1975. In 2009, government recognized the potential value of the deposit and initiated a multi-phased exploration program to improve understanding of the deposit and assist in its development.

Government requested and received detailed development proposals for the deposit. Negotiations between government and the successful proponent, Altius Minerals and two partners that are Chinese steel producers, are ongoing. A successful conclusion to negotiations would be followed immediately by a feasibility study on the project. The project could provide a mine life in excess of 25 years, and significant employment and other economic benefits to the province.

The division provides technical advice, market research and economic analysis to government during this process.

Staffing

In November 2013, Dale O'Reilly was hired as Geologist I with Mineral Incentive Program.

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**.

Staff Changes

There have been several staff changes in the Mineral Lands Division during the past year. In November 2013, **Andrea Devereaux** was appointed as Quarry Materials Compliance Officer responsible for eastern Newfoundland. In December 2013, **Chris Moran** was appointed Geologist II with the Core Storage Program, based at the Pasadena Core Library. In February 2014, **Matthew Snow** was appointed to the position of Mineral Exploration Site Inspector. In June 2014, **Stephen Hinchey** was appointed Mineral Exploration Monitoring Geologist. One position is vacant and is the subject of an ongoing job competition.

Mineral Rights

The Mineral Rights Section (**Laurie Hennessy, Stephen Hinchey, Trina Adams, Justin Lake, Charles Newhook, 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 real-time, online, map-based claim staking. It integrates mineral rights information with the province's geographic information and financial management systems.

Changes were made to the *Mineral Act* in 2014 to extend the term of a mineral license from 20-years to 30-years. Licenses extended past 20-years are subject to extra conditions, including a reduced maximum size, increased expenditure requirements and an annual renewal fee. MIRIAD was also updated to reflect these changes.

Mineral rights are also managed through several hardcopy 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. Work continues on a project to digitize all of these records and make them available to the general public via a web-based application.

The Historical Mineral Tenure Project continued in 2014. Digital files for all historic fee simple mining grants were finalized in 2014 and will be available through the Geoscience Online website in 2015. Work is continuing on preparing digital files of historic concession lands and it is anticipated that this information will also be available through the Geoscience Online website in 2015.

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

The Quarry Materials Section (**Gerald Kennedy, Ges Nunn, Andrea Devereaux, 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 plans to ensure these do not have a negative impact on the mineral and aggregate resources of the province.

There were 1945 quarry permits and 88 quarry leases issued in 2013 with a total reported production of 5 289 935 m³. As of October 4 2014, inspection staff have completed 1358 inspections, and issued 10 stop-work orders.

Development of a new Quarry Management System (QMS) continued in 2014. The new QMS will consist of three components: a public facing component providing for the online acquisition and renewal of quarry permits and quarry material exploration licenses and payment of required fees, an internal maintenance component and an offline inspection component.

Core-Storage Program

The Core-Storage program (**Glen Penney and Chris Moran**) is responsible for six core-storage libraries located throughout the province. 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 explo-

ration 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 non-government agencies must be notified of work intent and are given the opportunity to provide feedback. **Heather Rafuse** administers the Exploration Approval process and, to date, there have been 234 applications processed in 2014, compared to a total of 228 by year-end 2013.

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 **Matthew Snow** completed on-site inspection of 68 exploration project sites by mid-September with inspections ongoing into the fall. Of the 68 project sites inspected, 28 are historical sites inspected to document ground conditions and natural re-vegetation in areas disturbed during past exploration activity for the ROLES Project.

GEOLOGICAL SURVEY DIVISION

Director's Office

Martin Batterson	Director	729-3419	martinbatterson@gov.nl.ca
Wayne Tuttle	Administrative Assistant	896-5162	waynetuttle@gov.nl.ca
Cordell Deering	Administrative Officer	729-7715	cdeering@gov.nl.ca
Gerry Hickey	Administrative Assistant	729-2174	gerryhickey@gov.nl.ca

Regional Geology Section

Alana Hinchey	Section Head	729-7725	alanahinchey@gov.nl.ca
Ian Knight	Project Geologist	729-4119	ianknight@gov.nl.ca
Brian O'Brien	Project Geologist	729-3994	brianobrien@gov.nl.ca
Doug Boyce	Project Geologist	729-2163	dougboyce@gov.nl.ca
Charlie Gower	Project Geologist	729-2118	cgower@gov.nl.ca
Bruce Ryan	Project Geologist	729-2111	bruceryan@gov.nl.ca
Tim van Nostrand	Project Geologist	729-4311	timvannostrand@gov.nl.ca
Andrea Mills	Project Geologist	729-1733	andreamills@gov.nl.ca
Monica Squires	Geologist	729-6090	monicasquires@gov.nl.ca

Geochemistry, Geophysics & Terrain Sciences Section

Stephen Amor	Section Head	729-1161	stephenamor@gov.nl.ca
John McConnell	Geochemist	729-2167	johnmcconnell@gov.nl.ca
Chris Finch	Director-Geochemical Laboratory	729-3312	chrisfinch@gov.nl.ca
Rosaurol Roldan	Chemist	729-3352	rosauroroldan@gov.nl.ca
Robyn Constantine	Geophysics Support	729-7445	robynconstantine@gov.nl.ca
Dave Taylor	Project Geologist	729-5624	davetaylor@gov.nl.ca
Jennifer Organ	Project Geologist	729-1664	jenniferorgan@gov.nl.ca
Denise Brushett	Project Geologist	729-3640	denisebrushett@gov.nl.ca
Melanie Irvine	Project Geologist	729-3489	melanieirvine@gov.nl.ca
Gerald Kilfoil	Geophysicist	729-2169	gerrykilfoil@gov.nl.ca
Jerry Ricketts	Project Geologist	729-3888	jerryricketts@gov.nl.ca
Jennifer Kelly	Chemist	729-3375	jenniferkelly@gov.nl.ca
Lisa Connors	Chemist	729-3322	lisaconnors@gov.nl.ca

Geoscience Data Management Section

Larry Nolan	Section Head	729-2168	larrynolan@gov.nl.ca
Loretta Crisby-Whittle	Project Geologist	729-2166	lorettacrisbywhittle@gov.nl.ca
Pauline Honarvar	Project Geologist	729-2301	paulinehonarvar@gov.nl.ca
Shawn Duquet	Project Geologist	729-1667	shawnduquet@gov.nl.ca
Gillian Roberts	Project Geologist	729-7727	gillianroberts@gov.nl.ca

Mineral Deposits Section

Andrew Kerr	Section Head	729-2164	andykerr@gov.nl.ca
John Hinchey	Project Geologist	729-7976	johnhinchey@gov.nl.ca
Greg Sparkes	Project Geologist	729-7290	gregsparkes@gov.nl.ca
Hamish Sandeman	Project Geologist	729-1980	hamishsandeman@gov.nl.ca
Greg Stapleton	Project Geologist, MODS	729-6071	gregstapleton@gov.nl.ca
James Conliffe	Project Geologist	729-4014	jamesconliffe@gov.nl.ca
Jan Smith	MODS Geologist	729-6059	jansmith@gov.nl.ca
Marina Schofield	MODS Geologist	729-7447	marinaschofield@gov.nl.ca

Geoscience Publications & Information Section

Sean O'Brien	Section Head	729-2775	seanobrien@gov.nl.ca
Phil Saunders	Mineral Exploration Consultant	729-6193	philisaunders@gov.nl.ca
Stephanie Neary	Clerk	729-2452	stephanieneary@gov.nl.ca
Cindy Saunders	Indexing Geologist	729-6280	cindysaunders@gov.nl.ca
Desirée King	Clerk	729-2180	desireeking@gov.nl.ca
Paula Bowdridge	Clerk	729-1311	paulabowdridge@gov.nl.ca
Christopher Pereira	Editor	729-6593	chrispereira@gov.nl.ca
Bev Strickland	Graphic Artist	729-2750	bevstrickland@gov.nl.ca
Joanne Rooney	Graphic Artist	729-2769	joannerooney@gov.nl.ca
Carolina Valverde Cardenas	Promotions Geologist	729-6651	cvalverdecardenas@gov.nl.ca
Kim Morgan	GIS Analyst	729-2265	kimmorgan@gov.nl.ca
Dave Leonard	Cartographer	729-2324	daveleonard@gov.nl.ca
Terry Sears	Cartographer	729-2957	terrysears@gov.nl.ca
Neil Stapleton	Cartographer	729-6989	neilstapleton@gov.nl.ca
Des Walsh	Geoscience Copy Editor		deswalsh@gov.nl.ca

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