

Annual review by C.O. Böhm

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Summary

In 2014, the Manitoba Geological Survey (MGS) conducted a broad range of partnered and nonpartnered geoscience projects to enhance and update the geoscience knowledge base of the province. Main geoscience priorities included

- Precambrian mapping projects in the Thompson nickel belt and northern Superior province east of Thompson, where there is high mineral potential for a variety of commodities; in the exposed and buried portions of the Flin Flon belt, where activities were concentrated in the Reed Lake and Lalor mine areas near Snow Lake; in the Northern Indian Lake area, where evidence for Archean basement may promote diamond prospectivity; and in the Rice Lake and Bird River belts in southeastern Manitoba, with focus on base- and precious-metals.
- participation in the final year of the federal-provincial Targeted Geoscience Initiative Phase 4 (TGI-4) focused on government geoscience in support of deep exploration to ensure the continued viability of mining in established communities. Collaborative research under this initiative is focused on auriferous base-metal systems in the Snow Lake area (Lalor deposit) and magmatic Ni-Cu-Cr systems in the Bird River belt (southeastern Manitoba).
- evaluation of hydrocarbon potential of onshore sedimentary strata of the Hudson Bay Basin in Manitoba, through collaboration with the Geological Survey of Canada under Phase 2 of the Geo-mapping for Energy and Minerals (GEM-2; 2014–2020) program.
- advanced studies of shallow gas-bearing Cretaceous formations in southwestern Manitoba to assess the potential for shallow shale gas as a future resource for the province, in partnership with Manitoba Hydro and universities. Completion of the digital three-dimensional (3-D) model of Phanerozoic stratigraphy in Manitoba south of 55°N contributes vital information to diverse fields of study, ranging from hydrogeology to petroleum potential.
- support of drift exploration throughout the province. State-of-the art Quaternary geoscience studies were focused on the Gillam area, in part to assess aggregate resource potential for current and future infrastructure development in the region.

In addition to providing geoscience knowledge, the MGS's geoscience programming promotes resource development, wise land management, Aboriginal engagement and mineral education to the public.

Roles of the Manitoba Geological Survey

In tune with the department of Mineral Resources vision of “Realizing Manitoba’s mineral and petroleum potential, and creating wealth for the benefit of all Manitobans”, the primary and long-term role of the MGS is to update, improve and expand Manitoba’s geological knowledge base. Geoscience information provided by the MGS supports and facilitates mineral and hydrocarbon exploration in the province. Moreover, geoscience activities conducted by the MGS directly address land-use and environmental issues facing Manitobans.

In today’s global economy, a modern, accessible government geoscience knowledge base is widely recognized as one of the important determinants of a jurisdiction’s investment climate for exploration and development. Geoscience attracts, stimulates and supports exploration investment by allowing industry to identify areas of favourable mineral potential. Government geoscience enhances the investment climate by reducing the cost and risk of private-sector exploration, and thereby not only improves returns on private investment but also increases revenues accruing to governments as royalties and taxes.

Contributing to the broad range and scope of MGS projects, partnered geoscience programming at the MGS is strongly aligned with government priorities and the needs of the following geoscience stakeholders to facilitate collaborations and promote resource sharing:

- **Industry:** The minerals and petroleum industries are the principal users of geoscience information generated by the MGS, and programs are therefore developed and designed to have maximum impact for these sectors. The MGS currently has research partnerships with a number of mineral-exploration companies (typically also including university partners) and with Manitoba Hydro.
- **Universities:** The MGS has long been successful in fostering close collaboration with a number of Canadian universities, as well as universities elsewhere. By providing resources and in-kind support for university collaborations, the MGS promotes quality public geoscience research in priority areas of the province. In addition, university collaborations bring access to expertise and analytical techniques that are commonly outside the MGS’s mandate or abilities.
- **Protected Areas Initiative:** Up-to-date geoscience information is required to guide decision-making processes regarding the establishment of new protected areas in sustainable balance with resource development across Manitoba.

- **Land-Use Planning:** Many First Nation communities are in the process of preparing traditional land-use documents that will shape development within their traditional lands. The MGS continues to provide geoscience information to First Nations through compilation of existing maps and data, or new geological mapping in their traditional territories.

Collaborations and partnerships

The MGS is engaged in many partnered initiatives, including contributions from the Federal Government, the mineral and energy industries, and several universities across Canada and beyond (currently United States, Ireland and New Zealand). These partnerships provide access to expertise and technologies that enhance the ability of the MGS to provide a state-of-the-art geoscience database for Manitoba. In addition, they facilitate the training of future geoscience professionals, which in 2014 included one post-doctoral researcher, four Ph.D. candidates, seven M.Sc. candidates and three B.Sc. (Honours) thesis projects.

Collaborative programming with the Geological Survey of Canada

The federal Geo-mapping for Energy and Minerals (GEM) program is designed to provide geoscience information on Canada's northern regions, to facilitate informed investment decisions and to foster discovery and development of new energy and mineral resources. The program collaborators include the Geological Survey of Canada (GSC), Ontario Geological Survey, Canada-Nunavut Geoscience Office, University of Manitoba, The Manitoba Museum and Laurentian University. Building on results of the first GEM Energy program (Hudson Bay and Foxe Basins Project; 2008–2013), the MGS's role in the new Hudson–Ungava Project of the GEM-2 program (2014–2020) is to integrate the Manitoba onshore Paleozoic succession into a regional framework and to advance assessment of its hydrocarbon source-rock potential. Results from this project directly feed into long-term resource development plans and strategies for Manitoba's far northeastern region.

The Targeted Geoscience Initiative Phase 4 (TGI-4) is a five-year (2010–2015), federally funded program that is co-planned and jointly delivered with the provinces and territories, which contribute funding for activities within their jurisdictions under the program. The TGI-4, which focuses on deep exploration and exploration-methods development, provides industry with the next generation of geoscience knowledge and innovative techniques, with the ultimate goal of more effective targeting of deeply buried mineral deposits. Projects being conducted under the TGI-4 in Manitoba and led by the GSC include alteration and metallogenic studies of the Lalor volcanogenic massive-sulphide (VMS) deposit near Snow

Lake (P. Mercier-Langevin), a 3-D seismic survey and ambient-noise imaging of the Lalor deposit (G. Bellefleur, E. Schetselaar), and studies of mafic–ultramafic intrusions and Ni-Cu-Cr-Pt-Pd mineralization in the Bird River belt (M. Houllé, V. Bécu).

Manitoba Geological Survey Geoscience Program

Precambrian Geoscience Section

In 2014, the MGS continued bedrock mapping in the Archean Pikwitonei domain, situated at the northwestern margin of the Superior province east of the Thompson nickel belt. Projects at Armstrong and Partridge Crop lakes (Couëslan, GS-1 and -2, this volume) provide new insight into the nature of variably retrogressed granulite-facies rocks and their polyphase tectonothermal evolution. Of particular interest are significant volumes of previously unrecognized, or underexplored, high-grade supracrustal rocks, similar to more readily recognizable sequences in adjacent lower grade domains. At Partridge Crop Lake, Archean fabrics and granulite-facies metamorphic assemblages are progressively overprinted by Paleoproterozoic fabrics formed under amphibolite-facies conditions toward the west (Thompson nickel belt). This transition provides an excellent opportunity to evaluate the effects and extent of the Paleoproterozoic overprint, and to compare rocks common to both the Thompson nickel belt and the Pikwitonei domain. Ultramafic rocks, interpreted to form part of an Archean volcanic assemblage at both Partridge Crop and Armstrong lakes, are enriched in Cr, Ni and Cu, suggesting potential for magmatic Ni–Cu–platinum-group-element (PGE) mineralization unrelated to the Paleoproterozoic ultramafic intrusions that host magmatic Ni-Cu deposits in the adjacent Thompson nickel belt.

In southeastern Manitoba, geological mapping was completed in the Mayville and Cat Lake–Euclid Lake areas along the northern arm of the Bird River belt (Yang and Gilbert, GS-3, this volume). The project utilizes mineral chemistry of chromite as a geochemically robust petrogenetic indicator to discriminate ca. 2740 Ma mafic–ultramafic intrusions that may be related to the 'Ring of Fire' Ni-Cu-PGE-Cr deposits in northern Ontario.

A new project to systematically characterize the most abundant but commonly least studied rocks in the Precambrian shield—granitoids—was initiated with mapping and sampling of a transect across the western Superior province in southeastern Manitoba (Yang, GS-4, this volume). The aim is to identify and catalogue the various types of granitoid rocks to investigate their petrogenesis, geodynamic settings and mineralization potential. The project is designed around a GIS-based database to capture the field relationships, petrography, litho-geochemistry and geochronology of granitoid rocks

throughout Manitoba, and their relationships to various mineralization types.

Also in southeastern Manitoba, structural and stratigraphic mapping of shear-related, vein-hosted Au mineralization in the vicinity of the Ross River pluton, Rice Lake belt, was completed in summer 2014 by University of Waterloo Ph.D. candidate X. Zhou (Zhou et al., GS-5, this volume). This detailed mapping revealed several generations of folds and shear zones associated with Au-bearing quartz veins identified on the basis of deformation styles and overprinting relations, providing a framework for intrusion-hosted Au exploration in the belt.

In the Flin Flon–Snow Lake belt, a number of geoscience projects took place around Manitoba’s newest mines at Lalor and Reed lakes. Gagné and Anderson (GS-6, this volume) conducted inland mapping west and northwest of Reed Lake that resulted in the important new finding that the West Reed–North Star shear zone is flanked on both sides by volcanic-arc terranes, and that a boundary between volcanic rocks of arc and oceanic affinities must be situated farther west than previously assumed, which consequently suggests that the area west and north of Reed Lake may have unrecognized potential for VMS and/or gold mineralization.

The GSC and university collaborators completed field studies at the Lalor auriferous VMS deposit near Snow Lake as part of the national TGI-4 program. Mercier-Langevin et al. (GS-7, this volume) utilized whole-rock oxygen-isotope analyses to map the distribution of high-temperature alteration in the laterally extensive, intensely altered footwall of the Lalor deposit. The study demonstrates that oxygen-isotope mapping can be successfully used to vector toward the high-temperature/alteration reaction zones commonly associated with VMS systems, and can thus be a particularly useful exploration tool in complexly deformed and strongly metamorphosed rocks.

Also at Lalor, Caté et al. (GS-8, this volume) conducted detailed underground mapping to establish the key structural controls on the setting and geometry of the deposit and its ore zones. Regional deformation events and local remobilization both appear to have affected the distribution of base- and precious-metal mineralization.

Select drillcore from the Gurney mine shear zone in the Brunne Lake area of the Flin Flon belt was examined in detail by J. Dunn, M.Sc. candidate at University College Cork, Ireland (Dunn and Gagné, GS-9, this volume). The aim of the project is to establish a structural framework for shear-hosted Au mineralization through detailed documentation of the relationship between mineralized veins, alteration and deformation fabrics. The results from this study provide an improved understanding of the controls on Au mineralization and will help guide further exploration along the main and subsidiary shear zones.

A geological scoping study of the Sherridon structure at the northern margin of the Flin Flon belt was conducted

to evaluate access, extent and quality of outcrop in areas affected by a 2008 forest fire (Couëslan and Martins, GS-10, this volume). Despite rapid vegetation regrowth and locally heavy deadfall, exposures in burned areas are generally excellent and warrant new mapping accompanied by extensive sampling for litho geochemistry and thin-section petrography to provide additional detail to existing maps. A proposed new study will focus largely on alteration features associated with VMS mineralization to assist exploration in this historical base-metal camp.

Geological mapping along the Churchill River at Northern Indian Lake focused on Paleoproterozoic supracrustal rocks of the Southern Indian domain and the adjacent plutonic rocks of the Chipewyan domain (Kremer and Martins, GS-11, this volume). Geochronological and isotopic analyses of samples from Northern Indian Lake will be used to further delineate the extent of crustal contamination by older basement, as was documented at Southern Indian Lake. Archean basement windows at Southern Indian Lake, as well as isotopic evidence of buried Archean microcontinental fragments, possibly related to the larger Sask craton, extending beneath part of the Chipewyan batholith, may indicate a favourable foundation for diamondiferous lithosphere in the region, with important implications for diamond exploration.

In addition to the Precambrian geoscience projects reported in this volume, MGS geologists are actively involved with a number of other research projects: a Collaborative Research and Developments (CRD) project on ‘volcanological, structural and metamorphic reconstructions of the Snow Lake VMS district’, led by Laurentian University (H. Gibson, B. Lafrance, D. Tinkham) and Mount Royal College (M. DeWolfe) geoscientists, and supported by HudBay Minerals Inc. This integrated project aims to provide new constraints on the metallogeny of juvenile-arc volcanic sequences within the western Trans-Hudson orogen. Under a second CRD project by Laurentian University (B. Lafrance), supported by QMX Gold Corp., Ph.D. candidate K. Rubingh conducted her final year of field studies on the lithostratigraphy and structures of the McLeod Road–Birch Lake thrust panel at Snow Lake. The MGS is providing in-kind and logistical support for both of these initiatives.

Sedimentary Geoscience Section

Phanerozoic stratigraphy and resources

Results from the collaborative, multiyear, GEM-2 Hudson–Ungava Project provide the foundation for hydrocarbon exploration and land-use planning of the Hudson Bay Lowland region between Churchill and Ontario. In 2014, the MGS significantly advanced its stratigraphic and structural studies of Manitoba’s Paleozoic onshore strata of the Hudson Bay Basin. In addition to detailed drillcore

and outcrop descriptions, organic-rich beds and laminae were sampled for organic-geochemistry analysis, and selected drillcore was sampled for conodont, chitinozoan and micropalynological biostratigraphy, as well as detailed $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ stable-isotope profiling (Nicolas et al., GS-12, this volume). Organic geochemistry results indicate that there are numerous thin organic-rich beds that are classified as good oil source rocks; these beds extend across a large geographic area. Most of these beds occur in strata that are suspected to be thermally mature, perhaps sufficient to have produced oil, which is contrary to previous theories. Other significant advancements in knowledge include important new mapping of the subsurface Paleozoic formational edges in the Hudson Bay Lowland, which resulted from detailed relogging of an exploration borehole. Stratigraphic omissions identified in the Paleozoic section at this location provide the first direct confirmation of large-scale structural complexities, indicating potential for structural/stratigraphic ‘traps’ in the Hudson Bay Lowland that may have an impact on oil prospectivity.

In addition to drillcore logging and sampling, the MGS 2014 field component of GEM-2’s Hudson–Ungava Project consisted of mapping and sampling key outcrops along the Churchill River, including lithostratigraphic type sections, and in the Churchill coastal area (Nicolas and Young, GS-13, this volume). Mapping results emphasize the stratigraphic and topographic complexities of the Paleoproterozoic–Paleozoic unconformity at local and regional scales, and indicate that Lower Paleozoic strata along the Churchill River, despite distinct features related to local depositional environments and conditions, correlate well with strata identified in drillcore and field sites elsewhere in the Hudson Bay Basin (e.g., Southampton Island, Nunavut).

Also in the Hudson Bay Lowland, collaborating researchers from the University of Manitoba continued diagenetic studies on Lower Silurian formations as a means of evaluating reservoir potential (Eggie et al., GS-14, this volume). Evidence indicates that progressive diagenesis, through multiple dissolution and dolomitization events, generally increased porosity, resulting in better reservoir qualities. Moreover, discovery of local oil staining in parts of the Ekwan River Formation suggests high potential for trapped oil accumulations in related Hudson Bay Basin strata.

The Upper Cretaceous in southwestern Manitoba continues to be a focus of various geoscience studies. Bamburak et al. (GS-15, this volume) found that anomalously high concentrations of rare-earth elements in outcrops of the Gammon Ferruginous Member of the Pierre Shale are likely related to accumulations of biological apatite, derived from fossilized bone material, rather than detrital grains of magmatic apatite. This association of rare-earth-element enrichment and fossil bones may be a useful diagnostic tool to search for additional ‘bone beds’

containing marine reptile fossils. Although the focus of this study in the past was to describe the potential for economic REE mineralization, the determination that REE seem to have only accumulated in fossil bones reduces the possibility of making an economic discovery. Further work will confirm or reject this hypothesis.

Late Cretaceous marine microfossils were the focus of collaborative studies with researchers from the University of Wisconsin (Muehlbauer et al., GS-16, this volume), who use foraminifera and radiolaria in the Pierre Shale along the Manitoba escarpment to reconstruct regional to global ocean-climate conditions driven by sea-level fluctuations during the Santonian–Campanian stage. The biostratigraphic data, including zonation and abundance of microfossils, provide taphonomic markers that can prove useful for regional correlations and onsite drillcore logging.

In addition to the activities reported in this volume, MGS geologists in the Sedimentary Geoscience section are actively involved in several other projects: geochronology of bentonite beds in the Manitoba escarpment to assist in constraining stratigraphic correlations; presentation of public-oriented YouTube™ videos, with MGS geologist J. Bamburak showcasing the geology of various road-accessible sites across southern Manitoba; collaboration with M.Sc. candidate K. Bates (University of Manitoba) on the stratigraphy and petroleum-potential study of the Devonian Duperow Formation in southwestern Manitoba; and collaboration with Ph.D. candidate S. Hosseinijad (University of Calgary) on a study of the geochemistry and gas potential of the Upper Cretaceous strata in southwestern Manitoba.

The MGS is also participating with the GSC and the Canada-Israel Research and Development Foundation of the Government of Canada in a study of in situ extraction of hydrocarbons from oil shale, by providing outcrop samples of Cretaceous oil shale from different parts of the Manitoba escarpment. In return for the MGS’s participation, all geochemistry results from the samples will be shared with the MGS.

Quaternary geology

The key objective of the Quaternary geoscience program is to provide the surficial geology framework to inform mineral exploration, resource development of glacial deposits (e.g., aggregate) and land-use management in the province. Successful mineral exploration and prospecting in Manitoba’s drift-covered northern regions requires a thorough understanding of surficial geology; geochemical and indicator-mineral analysis of till, combined with analysis of the orientation, timing and nature of ice-flow phases, can provide tools to more accurately locate exploration targets. In addition, Quaternary geological information plays an important role in infrastructure development. Development of

the province's sand and gravel aggregate inventory is critical for the construction industry and directly supports Manitoba's \$5.5 billion five-year plan to build core infrastructure.

A new, multiyear program of Quaternary geological mapping in the Gillam area was initiated last year with a three-week road survey. Reconnaissance results prompted new insight into the Quaternary geology of the area and underscored the fact that the existing data for the area, acquired during regional-scale mapping in the early 1970s, are insufficient for a modern understanding of the nature and distribution of glacial deposits. Consequently, more detailed mapping is needed to support mineral exploration and the rapidly growing and aggregate-dependent infrastructure and construction needs of hydroelectric-power developments in the region. Last year's results revealed a very complex Quaternary landscape in the Gillam area, with evidence for at least three different cycles of glacial deposition, as well as later inundation by both glacial Lake Agassiz and the Tyrrell Sea. Such complex paleogeology clearly warranted a larger, regional field program, including detailed mapping and sampling of tills and measurement of ice-flow indicators. Consequently, MGS conducted a four-week, helicopter-supported field program (Trommelen et al., GS-17, this volume) in collaboration with the University of Waterloo and with logistical support from Manitoba Hydro.

Three-dimensional mapping

As the MGS continues work on its comprehensive 3-D geological model of the Phanerozoic succession in southern Manitoba, several outputs are being released. The first key output from this work is a series of 134 cross-sections that was released as a digital set of downloadable 'vertical maps' on the new GIS Map Gallery. Recently, the MGS has focused on completing a new model of the bedrock surface, using the 3-D model data, that includes inputs from Manitoba's drillhole databases (water, oil and stratigraphic wells), large-lake bathymetric data, the Lake Winnipeg seismic survey, and surface datasets such as the provincial surficial-geology compilation-map series. This second key output has now been completed and will be available for download from the MGS website by the end of this year. The new model of the bedrock surface covers the entire province between latitudes 49°N and 55°N. It is expected that an isopach map of Quaternary deposits, utilizing this new bedrock-surface model, will be available in early 2015.

Manitoba's 3-D geological model, cross-sections and derived products use the same nomenclature for Phanerozoic geology in the province, making them easy to use and cross-reference. The model and its products continue to contribute to a variety of geoscience knowledge bases relevant to Phanerozoic stratigraphy,

hydrocarbon, groundwater and industrial-mineral resource development, and geological education.

Geoscience Information Services

The Geoscience Information Services section of the MGS is responsible for maintenance and expansion of the geological component of the Internet-based GIS Map Gallery, Mineral Deposit Database and Geochronology Database, and for supplying the organization with cartographic, GIS, CAD and database-management services.

Section staff advanced a new compilation of the sub-Phanerozoic Precambrian geology south of the Flin Flon–Snow Lake belt, in an area that extends south from the exposed Precambrian shield to latitude 54°N and east from approximately longitude 101°W to the extension of the Thompson nickel belt (approximately 7000 km²). As a basis for the compilation, all nonconfidential data from 603 assessment files and approximately 1700 diamond-drill holes are now compiled in one integrated database. For lithochemical correlations, the database also includes whole-rock geochemical data acquired by industry and the MGS from exploration drillholes, whereas nonconfidential high-resolution geophysical surveys from industry and the GSC provide the base for a new subsurface geological compilation map.

The geological component of the GIS Map Gallery continues to be expanded with new datasets, most recently the addition of glacial point and line features, including major moraines. Currently the released glacial data cover the area north of 54°N, and data compilation is progressing for the remainder of the province.

A new *Geological Highway Map of Manitoba*, based on revised 1:250 000 and 1:1 000 000 scale geological compilations, is an MGS priority project that remains in progress. The base compilation maps are currently being refined in conjunction with extensive work on the structuring of a new common legend. In addition, a system to collect and manage media files for the multimedia content of the new map was created and is now ready to be populated.

Community liaison

The MGS community liaison program (Murphy, GS-18, this volume) is designed to provide geoscience and mineral-resource information primarily to First Nation communities. The program aims to encourage a respectful, balanced, communicative approach that bridges the perspectives of Manitoba's First Nations, government and the mineral-resource sector. The program consists of classroom and field components.

In the summer of 2014, the MGS community liaison program, in partnership with the Natural Resource Institute (NRI) at the University of Manitoba, provided

geoscience and ecological outreach to hundreds of youth at Wasagamack First Nation in the Island Lake land-use area. Following a classroom-based learning component, a field component, consisting of geological-ecological-cultural activities, took place during three days at a camp located on Linklater Island in Island Lake, where participants could gain hands-on field experience.

In its second year with the God's Lake First Nation, the MGS liaison program included a 'remote camp work experience' during a community mapping project in the south basin of Gods Lake. This was the first geoscience-based project that has involved a First Nation community as an active mapping collaborator. The MGS geologists demonstrated and explained basic geological mapping techniques, including mineral and rock identification, note taking and sampling methods—common skills for some mineral-exploration and mining jobs.

Client Services and Outreach

Publications

A complete list of MGS publications, including reports, maps and data released since the *Report of Activities 2013*, is contained in the back of this volume.

The MGS continues to release the majority of its publications in hard copy (print and/or CD-ROM or DVD) for purchase through Publication Sales, as well as electronic format for free download from the Mineral Resources website.

Outreach

Investing in the future of all Manitobans, the MGS outreach program under the leadership of S. Michaels aims to inspire new generations to think 'geosciences' and to consider the many opportunities in Manitoba's vital minerals sector. The MGS 2014 mineral-education and community-based outreach program took geoscience to more young Manitobans, educators and the public (Michaels, GS-19, this volume):

- The new Manitoba Rocks! website received an exciting and noteworthy 50% increase in visitors and traffic since its launch in October 2013, leading to numerous requests from schools around the province for Manitoba Rocks! mineral-education information and presentations.
- The program connected with more than 2000 elementary and high-school students at Frontier School Division's 'Norway House Career Day' and the University College of the North's 'Thompson/The Pas Try-a-Trade & Career Expo', including participation by L. Murphy, the MGS community liaison geologist.
- The program engaged with new community organizations, such as the Northern Association of Community

Councils at their general meeting and trade show (August 2014).

- Teacher's information kits were distributed to the Northern Manitoba Mining Academy's teacher tours, and geo-backpacks for kids were provided to the Snow Lake Mining Museum, the Canadian Fossil Discovery Centre in Morden and the Stonewall Quarry Park.

The Manitoba Rocks! school program will be back by popular demand at the 2014 Manitoba Mining and Minerals Convention, in partnership with the Mineral Society of Manitoba, Mining Matters (Prospectors and Developers Association of Canada), the Canadian Fossil Discovery Centre and the Manitoba Prospectors and Developers Association, to engage more than 250 students in Grades 4 to 7 in learning more about our province's valuable mineral resources in a fun way—including gold panning!

Midland Sample and Core Library

The Midland Sample and Core Library, administered by the MGS, provides a large number and range of services to Manitoba Mineral Resources staff, the petroleum and mining industries, other branches of government and academia. For the MGS, the Midland facilities directly support geoscience projects through sample preparation, processing, storage and archiving. Core storage and viewing have become invaluable services for industry; the core-viewing area at Midland has been booked almost year-round, mainly by petroleum clients. The staff at Midland are continually reorganizing and optimizing the storage and viewing areas, as well as identifying lesser priority materials to be stored offsite (e.g., at Brady Road). Outside of Winnipeg, MGS drillcore-storage facilities are located in The Pas, Flin Flon, Thompson and Lynn Lake.

Acknowledgments

After 32 years with the MGS, Rick Unruh (lab technologist, Midland Sample and Core Library) retired in May 2014. His significant contributions, expert technical services and genuine helpfulness are most appreciated and will be missed.

The careful work of all MGS staff, including geologists, cartographers, lab technicians, expeditors, students, Client Services staff and administration, went into the production of the *Report of Activities 2014*. B. Davie and his team from RnD Technical provided professional technical-editing and project-management services, while L. Chackowsky and B. Lenton oversaw drafting of all illustrations and C. Steffano managed report production and publication layout.