

Annual review by E.C. Syme

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Summary

Geoscience activities of the Manitoba Geological Survey (MGS) in 2004 provided support to traditional mining camps, stimulated new exploration and development opportunities in frontier areas, and supported land-use, geohazard and development priorities in southern Manitoba. The program is reviewed annually by the Mineral Exploration Liaison Committee (MELC), composed of members of the Mining Association of Manitoba, the Manitoba Prospectors and Developers Association and the Manitoba-Saskatchewan Prospectors and Developers Association, as well as representatives from the universities of Manitoba and Brandon, and the Geological Survey of Canada (GSC).

Collaborative projects with the Geological Survey of Canada

Targeted Geoscience Initiative

The Federal government's Targeted Geoscience Initiative (TGI) entered its second and final year (ending March 2005). This initiative has brought \$5 million/year to enhanced geoscience programming across Canada. In Manitoba, three TGI projects involved collaboration between MGS and the GSC:

- 1) Trans-Hudson–Superior Margin Metallogene Belt (with Saskatchewan, Ontario and Quebec; \$800 000 TGI funding over two years): Project components in Manitoba include a jointly funded (federal-provincial) aeromagnetic survey, and multiagency bedrock mapping, geochronology, tracer isotope work and structural geology (GS-15, -14, -16, -18, -10 and -11). An aeromagnetic survey of eleven 1:50 000 NTS sheets (Figure 1) was completed in 2004 and the maps were released in November 2004.
- 2) Williston Basin Architecture and Hydrocarbon Potential (with Saskatchewan; \$720 000 TGI funding over two years): Project components include geoscience knowledge inventory, regional mapping (subsurface), geophysical investigations, regional hydrogeology, remotely sensed imagery, hydrocarbon assessment and a 3-D geological model (GS-25).

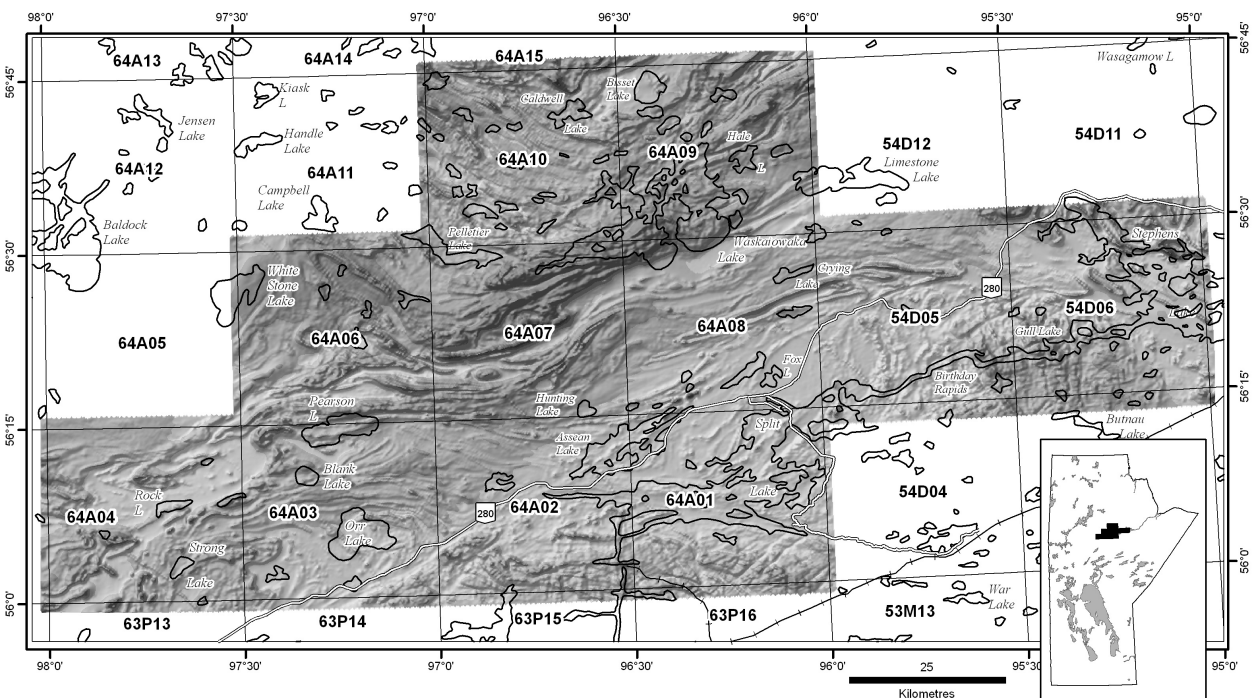


Figure 1: Aeromagnetic survey area, Superior Boundary Zone.

- 3) Western Churchill Metallogeny Project: This project aims to compile and synthesize geoscience knowledge spanning northern Alberta, Saskatchewan and Manitoba, and most of mainland Nunavut. Manitoba is contributing to this project through geological compilation of northern 1:250 000 NTS sheets and isotopic analysis of archive samples (GS-19).

Canadian Geoscience Knowledge Network (CGKN)

The Canadian Geoscience Knowledge Network (CGKN) is an initiative of the National Geological Surveys Committee (NGSC) to provide an Internet portal to Canadian geoscience information. A comprehensive metadata catalogue to facilitate discovery of geoscience data, maps and publications from federal, provincial and territorial geoscience agencies was the first major initiative of CGKN. This data catalogue has now been completed and is available on-line at http://cgkn.net/2002/services/index_e.html.

Cooperative Geological Mapping Strategies Across Canada

In 2003, Canada's Mines Ministers, at their annual meeting in Halifax, agreed with industry stakeholders on the value of the national geoscience database in ensuring Canada's competitive position for global exploration dollars. Ministers asked the NGSC to complete the implementation plan for the Cooperative Geological Mapping Strategies Across Canada (CGMS) as a matter of priority. The NGSC has identified a series of common policy goals, reassessed the geoscience knowledge gaps in each jurisdiction, and defined a portfolio of strategic initiatives to address these priorities. The CGMS implementation plan developed by the NGSC defines a suite of strategic initiatives and project activities that target three principal outcomes:

- A secure energy supply for Canada
- Prosperous resource-based communities
- New economic development opportunities

Although the NGSC has already benefited from considerable input from industry and other stakeholders concerning the gaps in the geoscience knowledge base and the kinds of activities that would be required to fill those gaps, it has not proceeded to the point of identifying and prioritizing the specific projects that would be pursued under CGMS. Beginning in the fall of 2004, the various geological surveys across Canada will engage industry, academic and community stakeholders with the goal of defining the CGMS project portfolio, and developing the technical and financial partnerships required to carry them out.

Precambrian mapping

The MGS conducted baseline geological mapping in the Precambrian Shield, primarily in the Thompson Nickel Belt (TNB) and the larger Superior Boundary Zone, the northern Superior Province and the Flin Flon Belt.

Flin Flon Belt

Researchers from Laurentian University, supported logistically by MGS and the Saskatchewan Geological Survey (SGS) and funded by NSERC and Hudson Bay Exploration and Development Company Limited, embarked on another year of detailed mapping following up on an earlier TGI project. Mapping in the stratigraphic footwall and hangingwall of the Flin Flon, Callinan and 777 deposits (GS-2) was accompanied by detailed work on the Myo rhyolite in Saskatchewan. This work is contributing significantly to a more complete understanding of the stratigraphic, structural and alteration setting of these major copper-zinc deposits, and has provided important new avenues for follow-up exploration.

A short field program in 2004 was carried out in order to complete detailed map coverage of the northern Flin Flon Belt, between the Manitoba provincial boundary in the west and the plutonic rock terrane of the Naosap Lake area in the east (GS-1). This work has not only completed the mapping but, in the process, identified several significant geological features and a number of areas prospective for volcanogenic massive sulphide and gold mineralization.

Thompson Nickel Belt

The Trans-Hudson Orogen-Superior Margin Metallotect TGI project, extending from Manitoba to Quebec, aims to provide new insight into the tectonic significance and metallogenic potential of this major feature of the Canadian Shield. The Thompson Nickel Belt (TNB) is one of the most richly mineralized segments of the metallotect, and MGS

work continues to focus on defining the nature and extent of the nickel-hosting Oswagan Group metasedimentary succession. Using sophisticated isotopic tools, this work is helping to extend the known limits of the TNB through areas of poor exposure northeast of Thompson, and to expand the geographic area prospective for nickel deposits.

Reconnaissance mapping of the Pearson-Rock-Orr lakes area and preliminary compilation of neodymium isotope data indicate that the basement Archean gneiss typical of the TNB, plus narrow belts of Oswagan Group supracrustal rocks, extend northeast of the main part of the TNB to Pearson Lake (GS-10). Although the structure involves complex interleaving with the generally barren Paleoproterozoic Burntwood Group paragneiss, the area is promising for further nickel exploration. An inferred suture zone, marked by Paleoproterozoic Sickle Group metasandstone northwest of the overthrust Burntwood Group, forms the limit of exploration for Thompson-type nickel deposits. Systematic variations in the amount of ancient crustal inheritance, if confirmed, may help unravel the complex structure of the Archean gneiss in an effort to locate previously unidentified keels of Oswagan Group rocks.

The Oswagan Group is only sporadically and incompletely exposed in outcrop due to extensive glacial overburden, but excellent exposures do occur in the open pits of the region's nickel mines. The shoulders of the South pit of the Thompson mine, the last area of such exposure not already mapped in a detail, was mapped in 2004, resulting in a refining of the subdivision of the Manasan and Thompson formations (GS-12). The structural style recognized in the South pit may have regional application in locating ore potential around ultramafic bodies, and an improved understanding of the Oswagan Group stratigraphy is crucial for its recognition in greenfields areas such as northeast of Thompson.

A sequence of the Bah Lake mafic-ultramafic volcanic and subvolcanic intrusive rocks is exposed on the northwest shore of Upper Oswagan Lake. Sampling for geochemistry and neodymium isotope analysis was carried out to further test the possibility of a comagmatic relationship between mafic-ultramafic flows of the Bah Lake assemblage and the ultramafic bodies associated with nickel deposits (GS-13).

Preliminary observations from Opegano Lake by GSC researchers suggest possible equivalents of the TNB located 15 km west of Thompson (GS-11). Additional inliers of the Oswagan Group could be present within areas that, in the past, have been assumed to be underlain by Burntwood Group migmatitic paragneiss.

Superior Boundary Zone

The northwestern margin of the Superior craton is the site of many exploration targets, including nickel (in extensions of the TNB), shear-hosted gold (associated with ancient crust and regional deformation zones at Assean Lake), and diamonds. Mapping along the Superior craton margin contributes to an understanding of the tectonic configuration of this complex zone, and therefore provides a valuable tool for outlining possible new targets for exploration. Mapping in the Superior Boundary Zone is being conducted by MGS as the provincial component of the Trans-Hudson-Superior Margin Metallotect TGI project.

The Split Lake Block is a shear zone-bounded lozenge of Archean and Paleoproterozoic rocks that lies along the northwestern paleomargin of the Superior Province (GS-16). Overall, the lithological and metamorphic characteristics of the Split Lake Block are similar to the bounding Pikwitonei Granulite Domain. The oldest units in the area include pelite, and mafic to ultramafic granulite that is interpreted to be supracrustal in origin. An igneous complex, composed of anorthosite, anorthositic gabbro, gabbro and mafic tonalite, has an unknown age relationship to these supracrustal rocks. The large amount of Archean and Proterozoic mafic and ultramafic magmatism in the northwestern Split Lake Block gives the area significant potential for titanium, platinum group element, and nickel deposits.

The Gull Rapids area is located at the eastern margin of the Split Lake Block, on the northwestern margin of the Superior Province. Work by MGS at Gull Rapids was initiated in 2003 to address the need for a detailed geological record of the site, which is the location of a potential future hydroelectric-generation structure. Structural and lithological mapping are providing detailed bedrock maps important to Manitoba Hydro for engineering purposes. Results from 2003 included the production of detailed 1:500-scale maps and the acquisition of geochemical and geochronological data.

Five main rock assemblages at Gull Rapids (GS-14) include basement granodiorite gneiss that is possibly related to similar rocks in the adjacent Split Lake Block, mafic metavolcanic rocks (amphibolite), metasedimentary rocks, late-stage granitic and tonalitic intrusions, and latest stage (Paleoproterozoic) mafic dikes. The diversity of detrital zircon ages in the metasedimentary rocks, between ca. 2.70 and 3.3 Ga, indicates that several sources contributed detritus, including the ca. 2.86 and 3.17 Ga orthogneiss at Gull Rapids. All rock types, except for the mafic dikes, are Archean and affected by the five generations of structures (GS-15).

In 2004, work continued to document the transition of structures from the Central Split Lake Block into the Aiken River deformation zone (GS-18). The Aiken River deformation zone shows evidence for movement that may be related

to movement on the gold-hosting Assean Lake deformation zone to the north, suggesting that the Aiken River deformation zone may also have potential for mineralization. The tectonic configuration of the study area along the Superior craton margin, where thick Archean lithosphere is bounded by major sutures against the Paleoproterozoic Trans-Hudson Orogen, is also favourable for kimberlite emplacement.

Far north

The Nejanilini granulite domain is one of Manitoba's last large tracts of land that is relatively unknown and unexplored in terms of its geological nature, evolution and mineral potential. Previous mapping and petrographic studies suggest that the dominantly felsic intrusive rocks of the Nejanilini Domain form part of the southeastern Hearne craton margin. This model was reevaluated by integrating samarium-neodymium isotope data from archival samples of nine granitoid and one metasedimentary rocks (GS-19). Neodymium (crustal residence) model ages of the granitoid samples cluster in the tight range 3.0–3.2 Ga, while a ca. 2.8 Ga neodymium model age of a metapelite suggests a Neoproterozoic average sediment provenance, likely from the Hearne basement. Metasedimentary rocks of the Nejanilini Domain, as well as supracrustal sequences of the Seal River and Great Island domains to the south, likely form part of the regional 2.1–2.4 Ga Hurwitz Group.

The Archean granulitic rocks of the Nejanilini Domain form part of a stable cratonic crust that may have developed a deep lithospheric keel; moreover, the Nejanilini and adjacent crustal domains form the margin of the Archean Rae-Hearne craton, making the study area a prime target for kimberlite exploration. Base- and precious-metal occurrences are confined to the Seal River metavolcanic rocks and the unconformably overlying Great Island Domain. Structurally controlled gold mineralization is spatially associated with iron formation in both the Seal River metavolcanic rocks and the overlying rocks of the Great Island Domain.

Mineral deposit studies

Mineral deposit studies were conducted for a variety of commodities, primarily in the Lynn Lake belt and Bissett areas (gold), Flin Flon Belt and southeastern Manitoba (platinum group elements), the Interlake (Mississippi Valley-type lead-zinc) and the Lynn Lake–Leaf Rapids region (polymetallic deposits). Compilation of kimberlite-related information was conducted across the entire province.

Gold

In addition to the field projects summarized below, MGS staff undertook working visits to a number of advanced gold projects (e.g., North Star, Assean Lake, Monument Bay and Rice Lake belt).

In 2004, the focus of the southeastern Manitoba gold metallogeny project shifted to the economically important central portion of the Rice Lake belt (GS-20). A new three-fold subdivision, proposed for the Bidou assemblage north and east of Rice Lake, includes three distinct lithostratigraphic associations that have implications for regional structure and base-metal exploration. 'San Antonio-type' auriferous vein systems are not restricted to the San Antonio sill, as previously thought, but are newly recognized in rocks of varying composition and apparent competency. These veins provide an excellent opportunity to establish the relative timing of the 'San Antonio-type' vein systems with respect to the regional deformation history, and thus address the tectonic setting and significance of the auriferous structures.

Regional structural studies in the Lynn Lake Belt have been conducted since 1999, in order to understand the setting and genesis of lode gold deposits in the region (GS-6). Work in 2004 has further delineated major shear zones and has shown that the distribution of shear-hosted gold mineralization in the Lynn Lake belt may be influenced, in part, by macroscopic fold repetitions of the volcanic stratigraphy. The location of some shear zones within the portion of the Lynn Lake belt with the most favourable metamorphic grade for gold mineralization (i.e., greenschist facies) and a large number of electromagnetic conductors represents an inviting gold-exploration target.

High-grade gold mineralization in and north of the Assean Lake deformation zone in the Superior Boundary Zone consists of gold-bearing quartz veins emplaced within tightly folded rocks of the pre-3.0 Ga Assean Lake Crustal Complex (GS-17). Vein emplacement is associated with deformation in the Assean Lake shear zone under greenschist-facies metamorphic conditions, probably during the Paleoproterozoic and potentially related to the Trans-Hudson Orogeny (GS-18). This timing and emplacement model bears a striking similarity to gold mineralization within the Hearne Province, which represents the northern hinterland to the Trans-Hudson Orogen. The confirmation of Paleoproterozoic timing for gold mineralization at Assean Lake has major implications for gold prospectivity of major shear zones in the Superior Boundary Zone.

Diamonds

Northern Manitoba has seen intensive staking in the past six years in response to positive and widely spread diamond indicator mineral results from MGS surveys in the Superior Province (GS-30). The MGS is continuing with data compilation and interpretation to maximize the quantity, quality and digital distribution of public-sector information bearing on kimberlite potential in Manitoba. These initiatives include:

- 1) Kimberlite Indicator Mineral (KIM) Database (GS-31): The Manitoba KIM Database was created in order to bring all existing published data together in one coherent package. Over 30 publications containing more than 5000 samples are included, with much of the data now available on the Survey's Internet GIS map gallery. The KIM database, now at version 3.0, has been upgraded and updated since its initial release in early 2003 to include several new features and datasets, and a new and consistent mantle garnet classification.
- 2) Till and Phanerozoic stratigraphy in the Hudson Bay Lowland
- 3) An 'integrated anomaly map', created from the compilation of diverse datasets in a GIS, to produce a presentation identifying structural and petrological anomalies that may have some bearing on kimberlite exploration.

Platinum group metals

Humus samples collected from the area of the Mayville igneous complex will be analyzed for palladium to investigate the distribution of platinum group element (PGE) mineralization known to occur in this igneous environment (GS-21). Palladium's high mobility in aqueous surface environments contrasts with its ready and tight adherence to organic matter, making it an ideal pathfinder element for areal surveys of sulphide-poor PGE prospects. The aim of this study is to define and delineate the extent of PGE mineralization in an area underlain by a mafic-ultramafic intrusive body known to contain, in places, significant quantities of PGE.

In the Flin Flon Belt, drillcore was examined from two archive holes within the Chisel Lake mafic-ultramafic intrusion (GS-3). These holes intersected a massive to disseminated, stratabound and stratiform sulphide layer within the intrusion near its contact with sulphide-rich volcanic stratigraphy. The interaction of the mafic-ultramafic intrusive body with the massive sulphide deposit potentially created economically significant accumulations of PGE-bearing sulphides.

Drillcore was investigated from several holes into the Radar Lake nickel-copper-PGE prospect, located north of the Reed Lake mafic-ultramafic complex in the central Flin Flon Belt. Despite uncertainties regarding the analysis of drillcore, the property appears to merit further exploration work, such as geological mapping of the site and reanalysis of sulphide-bearing samples.

Mississippi Valley-type lead-zinc

For over 30 years, Mississippi Valley-type (MVT) lead-zinc mineralization has been sought in Manitoba. The first clear evidence of MVT mineralization in the north basin of Lake Winnipegosis has now been documented in a joint study conducted by a local explorer and the MGS (GS-26). Drilling near the northeast end of Pemmican Island in 2004 intersected 15 cm of sulphide-bearing dolomite that grades 4.59% zinc, 0.41% lead, 0.014% copper, 10.4% iron and 14.05% sulphur, at a depth of about 15 m below the lake level. The mineralization is situated within dolomite of the Cedar Lake Formation (Silurian Interlake Group), and located within or adjacent to major structural elements in the Western Canada Sedimentary Basin.

Polymetallic deposits

A range of geological and tectonic features and varied styles of mineralization and alteration are spatially and genetically associated with a previously unrecognized geotectonic belt southeast of, and parallel to, the gold-mineralized Johnson Shear Zone (Lynn Lake–Leaf Rapids region). The belt has been named the Eden deformation corridor and hosts the Eden polymetallic mineral belt (GS-7). A variety of igneous and/or hydrothermal styles of mineralization and alteration are documented along this belt, including carbonatite bodies rich in rare earth metals, nickel-copper-PGE sulphides, sulphide-facies iron formation, rare metal pegmatites, thorium-uranium radiometric occurrences, and various forms of hydrothermal alteration.

Geochemical surveys

Investigation of spruce bark and soil geochemistry at the Poundmaker gold deposit illustrates the application of metal and rare earth element (REE) studies of spruce bark in the exploration for vein gold deposits in the Bissett area (GS-22). The data show that considerable gold appears to have been lost during the ashing process. The nondestructive INAA method may provide more reliable analytical data for gold exploration.

Spruce bark analyses in the vicinity of a 'barren sulphide' zone in the Shelia-Margaret lakes area near Lynn Lake are anomalous in a number of elements, including total REE; the bark appears to be a viable exploration medium in areas of shallow overburden (GS-9). The sulphides are interpreted to be a distal exhalite and have the potential to be associated with a massive sulphide deposit.

Enzyme LeachSM and TerrasolSM (partial leach) studies of soils at the MacLellan (Agassiz) gold-silver deposit at Lynn Lake show that both methods are effective in detecting buried mineralization at the MacLellan mine (GS-8). The REE data will be of assistance in discriminating 'false' anomalies derived from metals in transported overburden from anomalies derived from oxidation of a buried mineralized body in the bedrock.

Enzyme LeachSM data for peat and clay beneath a bog and under Reed Lake in the Flin Flon Belt show that exhalite related to base-metal hydrothermal systems provides different responses in the two media (GS-4). The application of this type of study in areas where there are bog- and lake-covered geophysical conductors is a cost-effective method of evaluating conductors prior to undertaking a drill program.

Phanerozoic investigations

The Williston Basin TGI project is undertaking a new, multidisciplinary, coordinated geoscientific study aimed at characterizing and understanding basin architecture and hydrocarbon potential (GS-25). This project is in the last year of a two-year study, which will involve new work that builds on established scientific leadership, cooperation and expertise amongst federal and provincial government agencies and universities. Products will include a seamless 3-D geological model of Paleozoic and Mesozoic rocks, from basement to outcrop, in Manitoba and Saskatchewan, in a geographic area extending from the northern and eastern outcrop edge to the international border, and west to longitude 106°W. This regional synthesis will improve the geological framework of the Williston Basin and will be invaluable in subsequent hydrocarbon exploration.

Karst

The Limestone Bay Component of the proposed Manitoba Lowlands national park lies adjacent to the highly prospective Thompson Nickel Belt in the Grand Rapids area. Field investigations confirmed the presence of near-surface dolomitic bedrock (less than 3 m of overburden) and resulted in more than 200 karst and related features being found (GS-27). This investigation has demonstrated the potential for significant karst discoveries, mainly in the Baker Lake East area (located in the Proposed Addition to the Limestone Bay Component). The study has also highlighted the hitherto absence of systematic speleological research in this unique karst area.

Quaternary

Quaternary mapping has progressed on two fronts (GS-28), namely

- digital seamless compilation of 1:250 000-scale surficial geology for all of Manitoba from published paper and digital maps; and
- three-dimensional mapping of the southern Phanerozoic terrane of Manitoba, which uses the surficial geology as a key input.

The digital seamless surficial geology compilation is intended to replace the 1981 version of *Surficial Geological Map of Manitoba*. Most current and most detailed paper maps required for the 1:250 000-scale compilation have been digitized. Edge matching and polygon conflicts are being resolved with the aid of a digital elevation model (DEM) derived from the recently released shuttle radar topography mission (SRTM) data. Mapping of several previously unmapped areas was carried out with the aid of the SRTM DEM and limited ground truthing.

Three-dimensional geological mapping of the Phanerozoic succession in southern Manitoba, south of latitude 55°N and west of longitude 95°W, is being completed as a successor activity to the Prairie component of the National Geoscience Mapping Program (NATMAP). The Lake Winnipeg basin has been completed and, in combination with the

already completed southern Prairie NATMAP area of southeastern Manitoba, has enhanced the understanding of the eastern edge of Phanerozoic rocks. Surficial and 3-D geological mapping are required for effective land-use planning, and hydrocarbon, groundwater and industrial-mineral development.

Industrial minerals

The Rural Municipality of Grahamdale covers 28 townships in the Interlake area (GS-29). The municipality is underlain primarily by rocks of Silurian and Devonian age, and much of the bedrock is near surface. Aggregate resources are derived from crushed bedrock and from Quaternary beach deposits (sand and gravel). Data collected this summer in Grahamdale will be submitted to the Western Interlake Planning District, with appropriate recommendations for zoning of the resources.

Other projects

A dendrohydrological survey in the Winnipeg River basin aims to study the frequency, severity and causes of extreme droughts and low flows within the basin (GS-23). The Winnipeg River currently supports six hydroelectric generating stations in Manitoba, which collectively produce 585 MW of electricity, roughly 11% of total provincial production. The river also provides the largest single contribution to Lake Winnipeg and thereby has an important influence on the production of nearly 4000 MW from the Jenpeg Generating Station and other stations on the Nelson River. Fieldwork in the summer of 2004 established a new network of moisture-sensitive tree-ring sites within the Winnipeg River basin. These data will be used to develop estimates of streamflow prior to the establishment of instrumental flow measurements, thereby improving the understanding of severe drought in the basin — information critical to the management of hydroelectric facilities in Manitoba.

Since 2000, a project at the University of Manitoba has been underway at the Central Manitoba (gold) mine site in southeastern Manitoba to determine the potential for revegetation, phytoremediation and phytomining of gold mine tailings (GS-24). Metal accumulation was recorded in plant tissues of woody seedlings harvested after three growing seasons. Results suggest that, for revegetation purposes, the seeds of the adapted existing vegetation would be the best candidates. Modified humic substances were added to the tailings in 2004. Seedling survival and growth rates suggest that selecting the appropriate species and treatment rate is required for the best results.

Regional offices

The Flin Flon office provides regulatory and technical assistance to the mineral-exploration and mining communities in the Flin Flon–Snow Lake region (GS-5). The presence of a regional office in the centre of Manitoba's base-metal mining region allows local contact with the stakeholders in the region, provides a convenient place to submit applications and work required under the Mines Act, and allows staff to provide technical advice, both in the office and through field visits. The maintenance of a reference library of Industry, Economic Development and Mines publications, as well as technical papers from other sources, provides a resource for continuing mineral exploration work in the region.

The Thompson Office has been designated as a remote office for the Mines Branch. Applications for mineral dispositions will no longer be accepted in this office but can be faxed to either the Winnipeg or Flin Flon offices, where full service is available.

Core storage facilities

Manitoba's Mineral Resources Division has been storing Precambrian drillcore, obtained primarily from exploration drilling, since the early 1970s (GS-32). Since that time, the Manitoba government has created a substantial repository of drillcore at five locations throughout the province. Since 2001, work has been conducted to organize drillcore additions from recent years, update core library inventories, and conduct some core retrieval projects. In 2004, inventory organization and updating work was carried out at the Thompson, Lynn Lake and The Pas core libraries.

Compilation and partnerships

Partnerships and collaborative projects continue to expand the ability of MGS to provide multifaceted, effective geoscience programming in Manitoba. Such partnerships make the best use of combined funds and expertise, and result in programs that expand the traditional geological survey mapping programs. At this time, MGS is involved in 26 individual partnered programs, involving the federal government, other provincial governments, the mineral industry

and several universities. These projects will generate approximately \$1.55 million toward geoscience funding in the province for 2004–2005 and mentor the next generation of geoscientists, including two Post-doctoral Fellows, five Ph.D. students, six M.Sc. students and one B.Sc. student, from five Canadian and two American universities.

Geoscience information initiatives

Geological compilation projects underway in MGS include the 1:250 000 Bedrock Geology Compilation Map Series and Surficial Geology Compilation Map Series. Seventeen maps in the Surficial Geology Compilation Map Series were released this year and a new Internet Map Server project, focused on Quaternary geology, was added to the website. The Bedrock Geology Compilation Map Series program focused on provincial-scale compilation. No new maps were released this year, as work was concentrated on edge matching of existing sheets and derivation of a unified legend for the entire province. This base will be used as the background map for all Internet Map Server presentations and will be simplified for a new version of the 1:1 000 000 *Geology of Manitoba*.

Ongoing projects represent 400–500 geological maps to be produced from manuscripts or datasets, including the Thompson Nickel Belt compilation maps; Superior Boundary Zone suite of projects; Williston Basin TGI II project data management, map production and website development; surficial geochemistry and the diamond exploration strategy; and data management systems for stratigraphic information, geochronology and mineral occurrence data.

Client services

Client Services provides information production and distribution, outreach and communications services, including the publication of MGS reports and maps and maintenance and development of the Mineral Resources Division website.

In 2003–2004, 29 geoscientific reports and/or maps were published. Digitizing of out-of-print MGS publications was initiated to ensure long-term archival and reproduction capabilities and to improve client service by providing free downloads of the reports and maps from the website.

Mineral Resources Library projects included 1) a new bibliographic database for the Williston Basin TGI, 2) support for the CGKN metadata initiative, and 3) secure credit card transaction capabilities for online purchasing of MGS publications. The new E-store opened for business in November of 2003.

Major outreach activities included mineral education initiatives such as the Manitoba Mining and Minerals Convention Schools Program and Provincial Mining Week. Hands-on interactive activities complemented the earth sciences curriculum and helped increase public awareness of Manitoba's mineral resources and mining industry. The free activities drew more than 2700 visitors from the public and the school tours program.

A prospector training program, successfully delivered at Sagkeeng First Nation in June 2003, provided the foundation for new community-based prospector training to be developed for the north. The new Prospector Training program is a joint initiative between Manitoba Industry, Economic Development and Mines, the University College of the North (UCN), Assembly of Manitoba Chiefs, Mining Association of Manitoba, and Indian and Northern Affairs Canada. The program focuses specifically on mineral exploration and prospecting but is modularized to develop basic field skills that are transferable across sectors. The courses, offered through UCN, will be delivered in the communities and are expected to start in the spring of 2005.

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