

Alberta's Mineral Mapping Program: Public Geoscience to Support Alberta's Mineral Strategy

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Summary

In November 2021, the Government of Alberta released the Renewing Alberta's Mineral Future report¹ -- a strategy and action plan for Alberta to better understand, characterize, and capitalize on its untapped mineral potential. The strategy leverages Alberta's natural geological advantages and details six key areas to support and achieve Alberta's vision, with the first key area to "increase public geoscience". This strategy provided the Alberta Geological Survey (AGS) with the unique opportunity to initiate a massive investigation and data acquisition program. The program improved the utility of historical data through compilation and digitization, leveraged modern geophysical and remote sensing technologies to scan huge swathes of the surface and subsurface, ran modern lab analyses on extensive collections of existing public cores and samples, performed significant sample collection and mapping projects in strategic locations across the province, and developed public-facing interactive maps.

Novel/Additive Information

Thus far the program has led to:

- the acquisition of one of the largest high-quality regional airborne geophysical surveys worldwide, with over 1 million line-km covering the entire province (Fig. 1),
- new magnetotelluric data collection and modeling in Alberta's "kimberlite corridor",
- satellite-based multispectral mineral mapping in NE and NW Alberta,
- hyperspectral scanning of ~51,000 m of core supported by >75,000 spot XRF points, hosted within the new Core Data Interactive Map,
- 7000 litho-geochemical analyses,
- 703 X-ray diffraction analyses,
- 202 total carbon and sulfur analyses,
- completion of a till and stream sediment sampling program returning >1350 samples,
- 850 heavy mineral concentrate analyses,
- 4650 electron microprobe analyses,
- 4 weeks of field mapping and spectra collection on the Canadian Shield,
- collection and geochemical analysis of 312 new brine samples from 309 hydrocarbon wells,
- high-res photogrammetry of Devonian reef margin outcrops in the Rocky Mountains, as analogues to subsurface Li-brine reservoirs,
- digitization of 329 historical mineral assessment reports.

Conclusions

An incredible amount of new data has been collected to characterize Alberta's mineral resources. Many of these datasets have been published to the Alberta Geological Survey website and terabytes of data have recently been made available within new interactive mapping applications, which are also accessible on the AGS website².

Making this information and data available is critical not only for understanding mineral potential, but can also be leveraged to better understand Alberta's potential to support emerging resources. The AGS' core function of providing credible open access geoscience information is being leveraged in exciting new ways to support characterization of emerging resources and pore space use-cases, development and implementation of regulation at the Alberta Energy Regulator (AER), and land-use planning and communication of resource potential by the Government of Alberta (GoA) to both domestic and international audiences. The AGS' work to collect and interpret data related to Alberta's emerging resource potential presents career-development opportunities for Alberta geoscience professionals and aids the development of tomorrow's workforce.

This presentation will provide an overview of the Mineral Mapping program, highlight the diverse and extensive datasets that have been collected, and illustrate how the AGS team is going to great lengths to ensure this extensive collection is easily accessible to all stakeholders in a variety of usable and interactive formats.

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References

1. Government of Alberta, Ministry of Energy, November 2021, *Renewing Alberta's Mineral Future*. <https://www.alberta.ca/minerals-strategy-and-action-plan>
2. Alberta Geological Survey, 2024. *Alberta Geological Survey website*. <https://ags.aer.ca/research-initiatives/mineral-mapping-program>

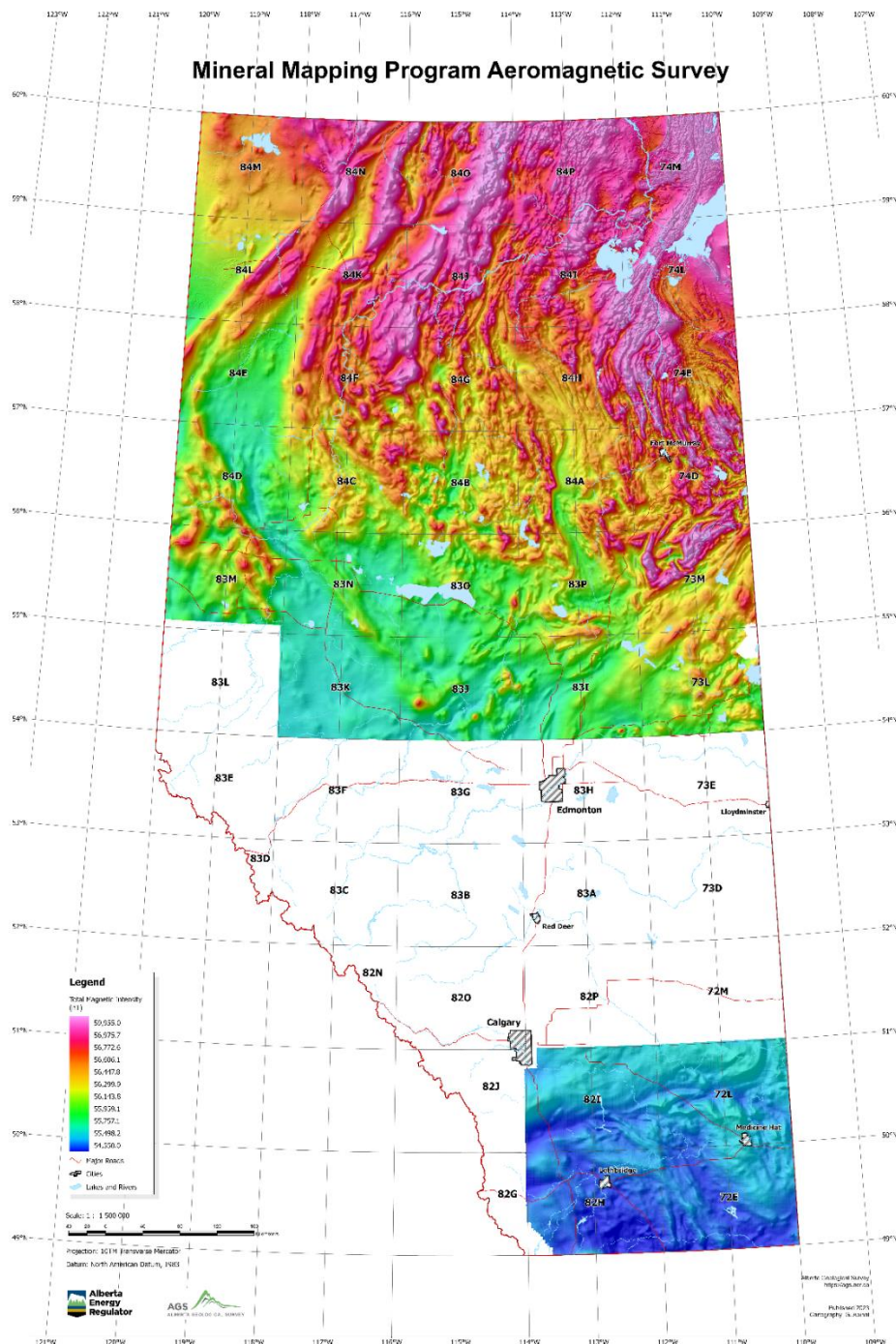


Figure 1. New high-quality airborne geophysical data (total magnetic intensity shown here) collected as part of the Mineral Mapping Program. Central Alberta data acquisition is complete and will be published once processed.