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Aeromagnetic survey program of the Geological Survey of Canada, 2002–2003

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Abstract: In 2002, the Geological Survey of Canada supervised an aeromagnetic survey contract totalling 28 400 line-km in the Bonnet Plume Basin–Peel Plateau region of the Yukon and Northwest territories**.** A detailed, time-domain-electromagnetic–magnetic survey in the Timmins–Kirkland Lake area, totalling 11 408 line-km, was also completed. Four additional aeromagnetic survey projects in southern New Brunswick, Committee Bay in Nunavut, and Colville Lake and the Mackenzie Delta in the Northwest Territories, flown in the previous year, were also published in 2002.

Résumé : En 2002, la Commission géologique du Canada a supervisé l'exécution à contrat d'un levé aéromagnétique sur une longueur linéaire totale de 28 400 km dans la région du bassin de Bonnet Plume et du plateau de Peel (Territoire du Yukon et Territoires du Nord-Ouest). Un levé détaillé magnétique-électromagnétique (domaine du temps) d'une longueur linéaire totale de 11 408 km a également été complété dans la région de Timmins-Kirkland Lake. Les résultats de quatre autres projets de levé aéromagnétique complétés l'année dernière dans le sud du Nouveau-Brunswick, la baie Committee, au Nunavut, ainsi qu'au lac Colville et dans le delta du Mackenzie, dans les Territoires du Nord-Ouest, ont en outre été publiés en 2002.

INTRODUCTION

In 2002–2003, the Geological Survey of Canada (GSC) aeromagnetic program included a survey over the Mackenzie Corridor of the Northwest Territories, continuing a multiyear acquisition project that commenced in 1998. In collaboration with Industry Canada, Falconbridge Limited, and the Ontario Geological Survey, a survey was carried out over the Abitibi greenstone belt in the Timmins-Kirkland Lake area of northern Ontario. A second reprocessing task for the Targeted Geoscience Initiative (TGI) project was to examine the Red Indian Line (a fault near Red Indian Lake), through the Buchans mining district in Newfoundland. Locations of these projects are shown in Figure 1, and survey details are summarized in Table 1.

NEW SURVEYS IN 2002

Northwest Territories

During the summer of 2002, the GSC continued with the fifth phase of the multiyear airborne magnetic survey over the Mackenzie Corridor region. The survey was carried out over the Bonnet Plume Basin and Peel Plateau area in the Yukon and Northwest territories, and covered NTS 106 E and 106 L. This new data set will be contiguous with the previous Mackenzie Corridor Phase II high-resolution survey of 1999 and will facilitate merging of the two data sets. The purpose of this survey was to provide new geoscience data, as no publicly available magnetic-survey coverage exists over this area. The magnetic-field patterns are indicative of the subsurface geological structure and will be used as an important element of geological mapping and resource exploration, and to assist in the siting of seismic lines.

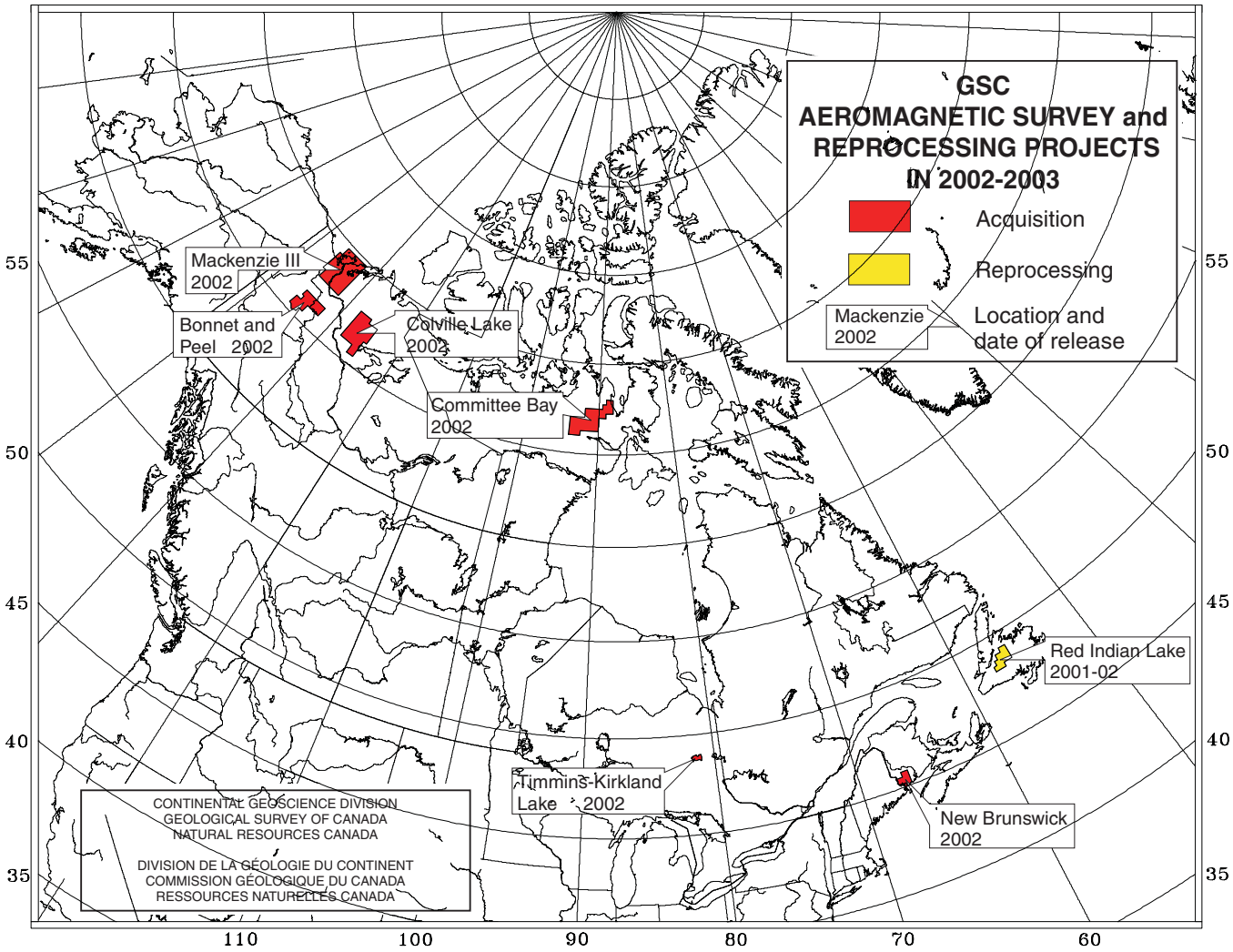

Figure 1. *Aeromagnetic surveys and reprocessing projects in 2002–2003.*

Table 1. Details of aeromagnetic surveys and reprocessing projects in 2002–2003.

Total field aeromagnetic surveys	Line km	Line spacing	Elevation of draped surface	Year of publication
Bonnet Plume Basin and Peel Plateau area, Yukon and Northwest Territories	28 400	800 m	200 m	2003
Colville Lake, Northwest Territories	50 780	800 m	200 m	2002
Committee Bay, Nunavut	85 300	400 m	150 m	2002
Mackenzie Delta, Northwest Territories	50 780	800 m	200 m	2002
Southern New Brunswick	26 800	200 m	100 m	2002
Timmins-Kirkland Lake,Ontario **Megatem®**	11 408	125 m 150 m	120 m	2002

Data reprocessing project	
	Line km
Red Indian Lake, Newfoundland	9479

The cost of data acquisition was jointly funded by the GSC, the Government of Yukon, and the Government of the Northwest Territories. The GSC was responsible for preparation of the survey contract, monitoring of survey operations, supervising the data compilation, and inspecting the final deliverables. Approximately 28 400 line-km of new data were acquired.

The survey digital data are currently being processed, and the results will be published jointly by the GSC, the Government of Yukon, and the Government of Northwest Territories as four-colour total-field aeromagnetic maps and four-colour vertical-gradient aeromagnetic maps at a scale of 1:100 000. All products will be released to the public by March 2003.

Ontario

During the winter of 2002, the GSC acquired airborne geophysical data over the Abitibi greenstone belt in the Timmins–Kirkland Lake area of northern Ontario (NTS 42 A). The project was initiated under the auspices of, and with the financial support of, Industry Canada's FedNor 'Discover Abitibi' program, the Ontario Geological Survey, and Falconbridge Limited. In collaboration with the Ontario Geological Survey, this area has been identified as having high mineral potential with insufficient public geoscience data. It is expected that the results of this airborne electromagnetic survey will stimulate mineral exploration and lead to increased economic activity. The results will also complement a major initiative by the Province of Ontario, called 'Operation Treasure Hunt', which has acquired and published airborne geophysical data in adjacent areas.

The survey was carried out by Fugro Airborne Surveys Corp. of Ottawa and covered 11 408 line-km. The survey results will be released jointly with the Ontario Geological Survey in the fall of 2003.

SURVEY DATA RELEASED IN 2002

Nunavut

The 2000–2001 detailed aeromagnetic survey over the Committee Bay greenstone belt in central Nunavut (NTS 56 J, K, O, and P), conducted under the Targeted Geoscience Initiative, was released to the public on March 7, 2002 as Open Files 4245 to 4251. Each open file consists of one total-field aeromagnetic map at a scale of 1:100 000.

Northwest Territories

The third phase of the multiyear airborne magnetic survey over the Mackenzie Corridor region of the Northwest Territories, flown in 2000 over the Mackenzie Delta area (NTS 106, 107, and 117), was released to the public on April 8, 2002 as Open Files 3967 to 3979. Each open file consists of one total-field aeromagnetic map at a scale of 1:100 000.

The fourth phase of the multiyear airborne magnetic survey over the Mackenzie Corridor region of the Northwest Territories, flown in 2001 over the Colville Lake area (NTS 96 L and M, and parts of 96 F, K, and N), was released to the public on October 1, 2002 as Open Files 4174 to 4181. Each open file consists of one total-field aeromagnetic map at a scale of 1:100 000.

New Brunswick

The 2001 high-sensitivity aeromagnetic survey over southern New Brunswick (NTS 21 G/02, /03, /06, /07, and /10), funded by the New Brunswick Department of Natural Resources and Energy (DNRE), was jointly released to the public by the GSC and DNRE on May 5, 2002 as GSC Open Files 4207 to 4235 and DNRE Map Plates 2002-1 to 2002-24. These publications consist of colour total-field aeromagnetic maps and colour first-vertical-derivative magnetic maps at a scale of 1:50 000, with a corresponding set of contoured first vertical derivative maps at 1:20 000 scale.

REPROCESSING

Newfoundland

Part II of the recompilation of airborne magnetic and electromagnetic geophysical data over the Red Indian Lake area of central Newfoundland, funded as part of the Targeted Geoscience Initiative, was released jointly by the GSC and the Government of Newfoundland and Labrador (GNL) in March 2002 as GSC Open File 4254 and GNL Open File 2773.

Geological Survey of Canada Projects 980008 and 010015