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**Ontario Geological Survey
Miscellaneous Paper 101**

**Annual Report of the
Regional and
Resident Geologist's
1981**

Edited by

C.R. Kustra

1982



Ontario

**Ministry of
Natural
Resources**

**Hon. Alan W. Pope
Minister**

**W.T. Foster
Deputy Minister**

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Blackburn, C.E.
1982: 1981 Report of the Kenora Resident Geologist; p. 1-14 *in* Annual Report of the Regional and Resident Geologists, 1981, Edited by C.R. Kustra, Ontario Geological Survey Miscellaneous Paper 101, 184 p.

FOREWORD

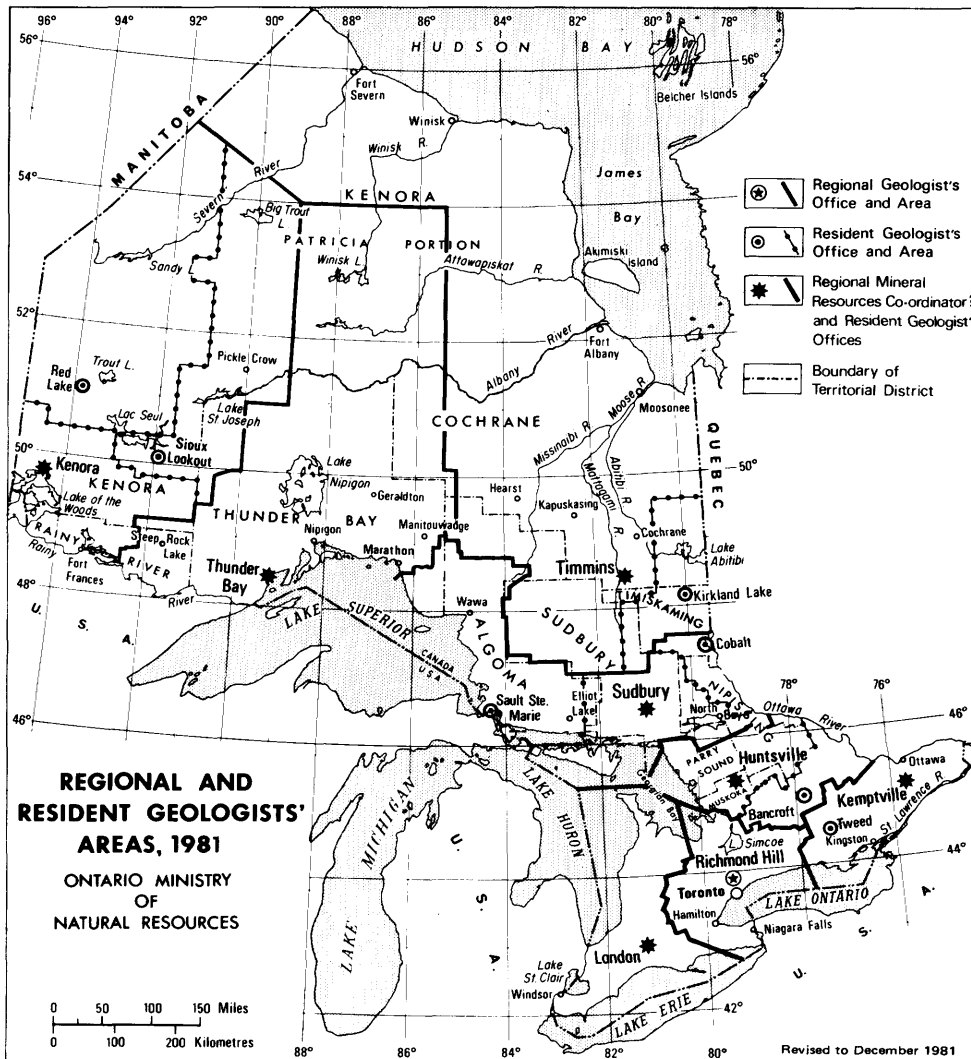
This report, summarizing the activities of Regional and Resident Geologists for the year 1981, is an account of mining and exploration activities in Ontario prepared from information collected and filed in 1981. Listings of new additions to the Assessment Files records, and reports of government survey and university sponsored projects are provided.

Regional and Resident Geologists are located in various centres of the Province to provide geoscience information and advice to the public on the geology and mineral deposits of Ontario. Each office maintains a library of published and unpublished reports including publications of the Ontario Geological Survey, other government agencies, records of exploration activity submitted for assessment work credit, company prospectuses and reports from the files of the Ontario Securities Commission, reports of property visits made by the Regional or Resident Geologists, and other staff geologists and information received directly from companies and individuals.

The Cobalt Resident Geologist's office was reopened on January 15, 1981 and is staffed by Leo Owsiacki. The office closed in 1967, when Dr. Robert Thomson retired.

W.H. McIlwaine resigned as Resident Geologist, Thunder Bay. It is expected the vacancy will be filled shortly.

C.R. Kustra
Liaison Geologist



REGIONAL MINERAL RESOURCES CO-ORDINATORS' OFFICES

		TELEPHONE
Northwestern Region	— R.C. Beard	Box 5160, Kenora P9N 3X9 (807) 468-3111
North Central Region	— K.G. Fenwick	435 James St. S., Thunder Bay P7C 5G6 (807) 475-1331
Northern Region	— W.O. Mackasey	60 Wilson Ave., Timmins P4N 3W2 (705) 267-1401
Northeastern Region	— J.C. Wilson	10th fl., 199 Larch St., Sudbury P3E 5P9 (705) 675-4128
Algonquin Region	— W.J. Logan	Brendale Sq., Huntsville P0A 1K0 (705) 789-9611
Eastern Region	— M.A. Klugman	Concession Road, Kemptville K0G 1J0 (613) 258-3413
Central Region	— L.G.D. Thompson	10670 Yonge St., Richmond Hill L4C 3C9 (416) 884-9203
Southwestern Region	— S. Keen	1106 Dearness Drive, London N6E 1N9 (519) 681-5350

REGIONAL/RESIDENT GEOLOGISTS' OFFICES

Kenora	— C. Blackburn	Box 5160, Kenora P9N 3X9 (807) 468-3111
Red Lake	— M.E. Durocher	Ont. Govt. Bldg., Box 860, Red Lake P0V 2M0 (807) 727-2252
Sioux Lookout	— D.A. Janes	Court Hse. Bldg., Sioux Lookout P0V 2T0 (807) 737-1291
Thunder Bay	— W. McIlwaine	435 James St. S., Thunder Bay P7C 5G6 (807) 475-1331
Timmins	— L.E. Luhta	60 Wilson Av., Timmins P4N 3W2 (705) 267-1401
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Sault Ste. Marie	— G.A. Bennett	875 Queen St. E., Sault Ste. Marie P6A 2B3 (705) 942-1414
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Huntsville	— D. J. Villard	Brendale Sq., Huntsville P0A 1K0 (705) 789-9611
Bancroft	— H.D. Meyn	Hwy. 28, Bancroft K0L 1C0 (613) 332-3940
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London	— P.A. Palonen	458 Central Av., London N6B 2E5 (519) 433-8431

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LIST OF PUBLICATIONS (back pocket)

1981 Supplement of Bulletin 25, List of Publications.
Ontario Geological Survey, Ministry of natural Resources.

Conversion Factors for Measurements in Ontario Geological Survey Publications

If the reader wishes to convert imperial units to SI (metric) units or SI units to imperial units the following multipliers should be used:

CONVERSION FROM SI TO IMPERIAL			CONVERSION FROM IMPERIAL TO SI		
<i>SI Unit</i>	<i>Multiplied by</i>	<i>Gives</i>	<i>Imperial Unit</i>	<i>Multiplied by</i>	<i>Gives</i>
LENGTH					
1 mm	0.039 37	inches	1 inch	25.4	mm
1 cm	0.393 70	inches	1 inch	2.54	cm
1 m	3.280 84	feet	1 foot	0.304 8	m
1 m	0.049 709 7	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	1.609 344	km
AREA					
1 cm ²	0.155 0	square inches	1 square inch	6.451 6	cm ²
1 m ²	10.763 9	square feet	1 square foot	0.092 903 04	m ²
1 km ²	0.386 10	square miles	1 square mile	2.589 988	km ²
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
VOLUME					
1 cm ³	0.061 02	cubic inches	1 cubic inch	16.387 064	cm ³
1 m ³	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m ³
1 m ³	1.308 0	cubic yards	1 cubic yard	0.764 555	m ³
CAPACITY					
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	4.546 090	L
MASS					
1 g	0.035 273 96	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 75	ounces (troy)	1 ounce (troy)	31.103 476 8	g
1 kg	2.204 62	pounds (avdp)	1 pound (avdp)	0.453 592 37	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	907.184 74	kg
1 t	1.102 311	tons (short)	1 ton (short)	0.907 184 74	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	1016.046 908 8	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	1.016 046 908 8	t
CONCENTRATION					
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t
OTHER USEFUL CONVERSION FACTORS					
		1 ounce (troy)/ton (short)	20.0	pennyweights/ton (short)	
		1 pennyweight/ton (short)	0.05	ounce (troy)/ton (short)	

NOTE—Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries published by The Mining Association of Canada in cooperation with the Coal Association of Canada.

1981 Report of the Kenora Resident Geologist

C. E. Blackburn¹

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¹Resident Geologist, Ontario Ministry of Natural Resources, Kenora, Ontario.

Introduction

The Resident Geologist's office is staffed by C. E. Blackburn, Resident Geologist, and M. Guderyan, secretary. S. Rivett, Resource Geologist, resigned his services September 4, 1981. A. Kolisnik, student resource technician, and A. Anderson, Experience '81 student technician, were employed during the summer months for field and office activities respectively.

Resident Geologist's Activities

C. E. Blackburn commenced duties as Resident Geologist in April 1981. Prior to this date, the duties of Resident Geologist for the Kenora Resident Geologist's district were carried out by R. C. Beard in conjunction with his duties as Mineral Resources Co-ordinator, Northwestern Region.

As part of the regular field program, several properties were visited that were undergoing development work. These included the property of Eco Mining Limited at High Lake, west of Kenora, where underground development work was continuing, and the property of Porta Metal Mills Limited at Witch Bay, Lake of the Woods, where a small portable mill had been set up to remill tailings. Several other properties undergoing active exploration were visited: Sulpetro Minerals Limited, Tabor Lake gold property south of Wabigoon; Denison Mines Limited, Shoal Lake gold properties near the Manitoba border; the gold property of Nuinsco Resources Limited at Cameron Lake, east of Nestor Falls; the gold properties of Sherritt Gordon Mines Limited at High Lake west of Kenora; the gold option of Selco Incorporated at Straw Lake, east of Nestor Falls. Other inactive mineral showings, and prospects currently being evaluated were examined and reported upon during the year.

Two producing mines outside the Kenora Resident Geologist's District were visited: the Mattabi copper-zinc mine at Sturgeon Lake, and Tanco's tantalum mine at Bernic Lake, Manitoba.

One special field project, begun in 1980, was continued during the year. Scott Rivett, Resource Geologist, assisted by A. Kolisnik, continued a gold deposit study in the Bigstone Bay area east of Kenora. This work consisted of the examination and sampling of the gold occurrences in the area to provide data and documenta-

tion on the deposits, and geological mapping to refine the geology and attempt to relate the gold deposits to stratigraphic and structural controls. Results of the work to date will be incorporated in a broader study planned for next year.

Airborne electromagnetic and magnetic maps resulting from surveys flown by Questor Surveys Limited and Kenting Earth Sciences (Canada) Limited over the Atikokan-Mine Centre and Manitou-Stormy Lakes areas respectively in the winter of 1979-80 were released by the Ontario Geological Survey in January, 1981. In connection with this release, staff from the Kenora Resident Geologist's office participated in public relations and media activities, and a geophysical map interpretation seminar at Dryden.

Input into land use planning in the Kenora Resident's area consisted of preparation of submissions on park candidates for each of the Dryden, Kenora, Fort Frances, and Ignace Districts, and preparation of policy statements.

As part of the Ministry's public information program, geoscience lectures and field trips were provided for the Rough Rock and Gelly Lake Junior Ranger camps, and three local high school groups. Kenora staff took part in a Career Day at the local high school. A 30-hour course on "Prospecting and Mineral Exploration" was offered by R. C. Beard and C. E. Blackburn through Confederation College in Kenora. A one-day gold assay seminar was organized in Dryden during October.

Mining Activity

No metallic mineral production was recorded in 1981 from any of the mining properties in the Kenora Mining Division.

Quarrying for decorative stone continued at the Rush Bay quarry west of Kenora. Quarrying of tombstone material continued at the Universal Granite Company's quarry near Vermilion Bay and a new quarry operation for similar materials commenced operation in May, operated by Nelson Monuments. Crushed rock was quarried at the White quarry northwest of Kenora, but no production was forthcoming from the Hawk Lake quarry east of Kenora.

Production of horticultural peat by Arctic Peat Moss Corporation, near Barwick, continued during 1981.

Underground development work, commenced in 1980, was continued at the Eco Exploration Company Limited's molybdenite deposit located at High Lake, west of Kenora. The shaft has been sunk to 750 feet, and development took place on three levels, at 230, 410, and 560 feet, with a loading pocket bin at 640 feet. Bulk sampling of the mineralized zones has proceeded. Approximately 2500 feet of underground diamond drilling has been carried out. Mill plant, designed to process 200 t.p.d., is the final stage of construction, with start up scheduled for Spring 1982.

Advanced exploration programs were reportedly carried out during the year and are currently underway on several gold properties in the area. These include the properties of Consolidated Professor Gold Mines Limited (Dupont Mine), Denison Mines Limited (Mikado, Cedar Island, Wendigo Mines), Sherritt Gordon Mines Limited (Dubenski property), and Sulpetro Minerals Limited (Tabor Lake Mine). At year end, Consolidated Professor Gold Mines Limited had entered into an agreement with Selco Incorporated on a joint venture, in which Selco Incorporated must spend at least \$900 000 on the Dupont property by April, 1982 (Northern Miner, December 31st, 1981).

The 200 t.p.d. portable gold mill installed by Porta Metal Mills of Sudbury on the site of the old Wendigo Gold Mine, southeast of Kenora, was operated briefly in 1981. Test runs on the old tailings reportedly produced recovery at grades less than anticipated. The mill was dismantled in September and was moved to the Goldlund Mine site, east of Kenora.

Exploration Activity

The trend in exploration activity continued that set during 1980. The number of claims staked are slightly higher than that year, and are the highest since 1974. As last year, this activity was mostly related to gold, though about 25 percent of staking has been for base metals. Considerable exploration activity, however, was related, as in 1980, to data research, surface examination and sampling, exploratory drilling, and property acquisition. Assessment work and other information received in 1981 shows that major work commitments are being met on many of the properties and parcels of land acquired by staking in 1980. Because of the over-commitment of some companies, many gold properties, however, have been allowed to lapse, only to be staked by other individuals.

Exploration for base metals continues as ongoing "grass roots" programs by at least two major companies.

Geographically, exploration work for gold has been concentrated in the Lake of the Woods, Kakagi Lake, and Manitou Lakes-Dryden, and Mine Centre areas.

Interest continues in a uranium property near Hawk Lake, in tantalum-lithium properties near Dryden, and towards the end of the year, in tungsten in the same area.

Gold

The slight decrease in staking of gold properties in 1981 reflects the fact that almost all properties of consequence were staked prior to this year, leaving only less-well documented prospects to be staked. New staking has been on these smaller properties, and on those that have come open because work commitments have not been met, and also in a few new areas where new con-

TABLE 1 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1981*	1,904	703	3,500	21,729	26,264	2,871	54,716
1980	1,877	788	3,208	15,428	3,149	859	21,368
1979	984	1,357	2,119	9,992	10,658	1,420	24,182
1978	808	1,357	2,300	22,299	7,576	2,143	34,934
1977	1,495	1,585	2,820	15,405	11,366	1,760	33,838
1976	1,380	2,125	3,234	25,030	21,367	5,960	55,042
1975	1,677	2,452	3,975	23,584	31,509	940	57,266
1974	2,653	1,076	4,727	29,496	18,049	3,070	52,134

* to Nov. 30

TABLE 2 MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

Ontario Geological Survey Reports	Coloured Maps
GR 202	2430 2438 2442 2447 2437 2440 2443
Open File Reports	Northern Ontario Engineering Geology Terrain Studies Report
OFR 5332 OFR 5358 OFR 5334 OFR 5369 OFR 5351	01 39 20 52 23 54 36
Preliminary Maps - Geological Series	Northern Ontario Engineering Terrain Studies Maps
P. 2394 P. 2395 P. 2405	5055 5066 5056 5067 5057 5068 5062 5070 5064 5072
Preliminary Maps - Data Series	Mineral Resources Branch Publications
P. 2064 P. 2129 P. 2130 P. 2131	MPBP 12
Aggregate Resources Publications	Miscellaneous Reports
-	-
Federal - Provincial Maps	Geological Survey of Canada Open File Reports
80458 - 80479 inclusive 80495 - 80511 inclusive	-

TABLE 3 EXPLORATION ACTIVITY DURING THE YEAR.

The following is a list of individuals and companies known to be engaged in exploration within the Kenora Mining Division in 1981 and the type of work undertaken in each case. The numbers correspond to the numbered areas on Figure 1.

Number on Figure	Individual or Company	Activity
1	Cone, Russell C. Jr.	Diamond drilling, Boyer Lake area.
2	Cone, Russell C. Jr.	Diamond drilling, Bad Vermilion Lake area.
3	Denison Mines Ltd.	Assaying, Clearwater Bay area.
4	Glatz, A.	Stripping, Hyndman Township.
5	Halvorsen, T. G.	Assaying, stripping, trenching, Phillips Township.
6	Hames, C. M.	Diamond drilling, Clearwater Bay area.
7	Lundmark, H.	Stripping, Melgund Township.
8	McMillan, R. L.	Diamond drilling, Little Turtle Lake area.
9	Moyer, L. H.	Stripping, Kirkup Township
10	Nolan Lake Exploration Inc.	Diamond drilling, Rowan Lake area.
11	Nuinsco Resources Limited	Geophysical survey, geological mapping, diamond drilling, assaying, Rowan Lake area.
12	P.I.R.P. Holdings Inc.	Stripping, trenching, Bad Vermilion Lake area.
13	Portelance, R.	Trenching, Napanee Lake area.
14	President Mines Ltd.	Assaying, Kirkup Township.
15	Redden, J. W.	Stripping, Tabor Lake area.
16	Rollmac Exploration Corporation Ltd.	Diamond drilling, MacNicol Township.
17	Selco Mining Corporation Ltd.	Diamond drilling, Brownridge Township
18	Sherritt Gordon Mines Limited	Geophysical survey, Tweedsmuir Township.
19	Sherritt Gordon Mines Limited	Diamond drilling, Dogpaw Lake area.
20	Sherritt Gordon Mines Limited	Geophysical survey, Dogpaw Lake area.
21	Sherritt Gordon Mines Limited	Geophysical survey, Willingdon Township.
22	Teck Explorations Limited	Diamond drilling, Kaiarskons Lake.
23	Teck Explorations Limited	Diamond drilling, Long Point Island area.
24	Teck Explorations Limited	Geophysical survey and diamond drilling, Aulneau Peninsula area.
25	Terrell, M. A.	Diamond drilling, Garnet Bay area.

NORTHWESTERN — KENORA

TABLE 4

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

KENORA MINING DIVISION SYMBOLS AND ABBREVIATIONS								
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Aubrey Township	52F/14 SE	Hoban, Michael J.	Au	Assess	Tr, SD	1980	-	B-1
Aulneau Peninsula	52E/8 NW	Teck Explorations Ltd.	Zn, Cu Ag, Au	Assess	DD 1-220.5	1981	-	C-1
	52E/8 NW	Teck Explorations Ltd.	BM	Assess	Mag, EM	1981	2.3971	C-2
Bad Vermilion Lake	52C/10 NE	Cone, Russell C.	Au	Assess	DD 1-102	1981	-	EE-4
	52C/10 NE	Huston, Carl D.	Zn, Cu, Pb,Au,Ag	Assess	DD 14-3,273	1980	-	GG-1
	52C/10 NE	Huston, Carl D.	Au, Ag	Assess	DD 25-6,103.7	1980	-	GG-2
	52C/10 NE	Huston, Carl D.	Au, Ag	Assess	DD 5-1,143	1980	-	GG-3
	52C/10 NE	Manhattan Mine	Au	Non Assess	GL	1900	-	JJ-1
	52C/15 SE	Mine Centre Copper Property	Au, Ag	Non Assess	DD 6-1,444.6	1951	-	U-1
	52C/10 NE	P.I.R.P. Holdings Inc.	-	Assess	STr, Tr	1981	-	MM-1
	52C/10 NE	Wood Property (Noranda)	Ni, Cu	Non Assess	Property Exam	1917	-	KK-1
Bigstone Bay	52E/9 SW	Pine Portage Mining Property	Au	Non Assess	DD 2-176 Property Exam	1936 1960-61	-	R-4
	52E/9 NW	Sherritt Gordon Mines Ltd.	Au	Assess	GL	1980	2.3670	VV-1
	52E/9 NW	Sultana-Ophir Mining Co.	Au	Non Assess	Property Exam	1934	-	X-3
Blindfold Lake	52E/9 NW	Johnson-Nilson Group (Noranda)	Au	Non Assess	Property Exam, SA	1934	-	P-1
Bluffpoint Lake	52F/3 NW	Selco Mining Corp. Ltd.	Au	Assess	Mag, EM	1980	2.3565	H-1
	52F/3 NW	Selco Mining Corp. Ltd.	Au	Assess	DD 1-114.96	1980	-	H-2
	52F/3 NW	Selco Mining Corp. Ltd.	Au	Assess	DD 1-125	1980	-	H-3
Boyer Lake	52F/7 NE	Big Master Mine	Au	Non Assess	SA Pros Mine Report	1937-38 1919 1912	-	A-3
	52F/7 NE	Cone, Russell C. Jr.	Au	Assess	DD 1-105	1981	-	EE-1
	52F/7 NE	Gold Rock Mining Syndicate	Au	Non Assess	Pros	1928	-	General
	52F/7 NE	Robin Hood Mining Syndicate (Noranda)	Au	Non Assess	SA,	1936	-	DD-1
Brooks Lake	52F/4 NE	Parth-Lewes Property (Noranda)	Au	Non Assess	Property Exam,SA	1934	-	General
Brownridge Township	52F/15 SE	Selco Mining Corp. Ltd.	Ta, Li	Assess	DD 4-457	1980	-	M-8
	52F/15 SE	Selco Mining Corp. Ltd.	Ta, Li	Assess	Geochem	1980	2.3306	M-10
	52F/15 SE	Selco Mining Corp. Ltd.	Ta, Li	Assess	DD 6-739	1981	-	M-11
	52F/15 SE	Selco Mining Corp. Ltd.	Ta, Li	Assess	DD 3-411.0	1981	-	M-12
Buchan Bay	52F/11 NE	Birch Bay Gold Mines	Au	Non Assess	DD, Assay	1938	-	Y-1

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Butler Lake	52F/10 NE	Euro-Dollar Dev. Ltd.	BM	Assess	DD 1-233	1980	-	K-12
	52F/10 NE	Pidgeon Group (Noranda)	Au	Non Assess	Property Exam	1936	-	F-2
Clearwater Bay	52E/10 NE	Denison Mines Ltd.	Au	Assess	Assay	1980-81	-	T-1
	52E/10 NE	Hames, C. Marshall	Au	Assess	EM, GL	1980	2.3532	R-1
	52E/10 NE	Hames, C. Marshall	Au	Assess	GL, Geochem	1980	2.3532	R-2
	52E/10 NE	Hames, C. Marshall	Au	Assess	DD 3-598	1981	-	R-3
	52E/10 NE	Kenricia Gold Mines Ltd.	Au	Non Assess	DD, Property Exam	1935, 1937	-	E-3
	52E/10 NE	McCallum Property	Au	Non Assess	Tr, Property Exam	1935	-	S-1
	52E/10 NE	Noranda Mines Ltd. (Williams Option)	Au	Non Assess	GL, Tr	1936	-	P-1
Contact Bay	52F/10 NW	Nabish Lake Claims	Cu, Ni	Non Assess	EM, Mag	1962-63	-	V-6
Dash Lake	52F/4 SE	Dash Lake Occurrence	Au	Non Assess	Property Exam	1960	-	G-2
Dogpaw Lake	52F/5 SW	Gulf Minerals Canada Ltd.	-	Assess	DD 9-3,493	1980	-	00-1
	52F/5 SW	Noranda Exploration Co. Ltd.	Au	Assess	GL	1980	2.3792	Z-6
	52F/5 SW	Sherritt Gordon Mines Ltd.	Au, Ag	Assess	DD 3-1198	1981	-	PP-2
	52F/5 SW	Sherritt Gordon Mines Ltd. (John Howard Option)	Au	Assess	Mag, EM	1981	2.3836	PP-3
	52F/5 SW	Sherritt Gordon Mines Ltd. (Herbert M. Linnell Option)	Au	Assess	Mag, EM	1981	2.3836	PP-4
Echo Bay	52E/10 NW	Tibbo, Harold G.	Au	Assess	Assay, GL, Humus Geochem	1980	-	Y-1
Factor Lake	52C/9 NE	Murray, W. S.	Au	Assess	Tr	1980	-	A-1
Forgie Township	52E/10 NW	Teck Explorations Ltd.	BM	Assess	Mag, EM	1980	2.3609	Z-1
Furlong Lake	52F/3 SW	Halonon Pyrite Showing (Noranda)	py	Non Assess	-	1967	-	E-1
Garnet Bay	52F/11 NW	Terrell, Michael A.	Cu	Assess	DD 2-501	1981	-	M-1
Grassy Lake	52C/10 NE	Ferguson Mine (Noranda)	Au	Non Assess	Assay	1920	-	D-2
	52C/10 NE	Lucky Coon Mines (Noranda)	Au	Non Assess	SA	1930	-	G-3
	52C/10 NE	Ray Claims	Au, Ag	Non Assess	SA, Property Exam	1917	-	LL-1
	52C/10 NE	Smilie Property	Au	Non Assess	DD 5-198	1936	-	HH-1
	52C/10 NE	Smilie Property	Au	Non Assess	DD 5-198	1936	-	HH-1
Halkirk Township	52C/10 NW	Armstrong, George	Zn, Cu	Assess	DD 7-2514	1980	-	H-19
	52C/11 NE	Belacoma Mines Prop.	Cu, Ni	Non Assess	Property Exam	1973	-	B-14
	52C/11 NE	North Rock Exploration Ltd.	Cu	Non Assess	Property Exam	1973	-	W-2
	52C/11 NE	North 60 Explorers Ltd. Prop. (Salmac Exploration)	Cu	Non Assess	Property Exam, IP, Mag.	1968	-	V-2
	52C/10 NW	Noranda Exploration (Young-Corrigan Option)	Au	Non Assess	Property Exam.	1958	-	Q-1
Harper Lake	52F/7 NW	Beth-Canada Mining Co.	Au	Assess	Geochem	1980	-	G-1
Haycock Township	52E/16 SW	El Diver Mine	Au	Non Assess	Property Exam	1935	-	S-1
	52E/16 SW	Champion Gold Mines Ltd.	Au	Non Assess	Pros	1924	-	D-2
	52E/16 SW	Champion Gold Mines Ltd.	Au	Non Assess	Pros	-	-	D-3
	52E/16 SW	Ontario Champion Mines.	Au	Non Assess	Pros	1928	-	D-4
	52E/16 SW 52E/9 NW	Treasure Mine	Au	Non Assess	Property Exam	1935	-	Q-2 Z-2

NORTHWESTERN — KENORA

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Herony Lake	52F/4 NW	Hupchuck-Sholwater Option (Noranda)	-	Non Assess	EM	1958	-	P-1
Hyndman Township	52F/9 SE	Dumond Property	Au	Non Assess	Property Exam, GL	1936	-	H-1
	52F/9 SE	Glatz, Alexander	Au	Assess	STr	1981	-	I-1
Jaffray Township	52E/16 SW	Caribou Mine	Au	Non Assess	Property Exam	1935	-	R-1
	52E/16 SW	Digman Mine	Au	Non Assess	Property Exam, Assay	-	-	T-1
	52E/16 SW	Terrell, Michael A.	Au	Assess	GL	1980	2.3672	U-1
Kaiarskons Lake	52F/3 SW	Teck Explorations Ltd.	Zn, Ni, Cu	Assess	DD 1-58.8m.	1981	-	G-1
Kawashegamuk Lake	52F/8 NW	Long Lake Mine	Au	Non Assess	Property Exam	-	-	H-2
Kirkup Township	52E/9 NW	Moyer, L. H.	Au	Assess	STr	1981	-	UU-1
	52E/9 NW	President Mines Ltd.	Au	Assess	SD	1980	-	SS-4
	52E/9 NW	President Mines Ltd.	Au	Assess	DD 1-64	1980	-	SS-5
	52E/9 NW 52E/16 SW	President Mines Ltd.	Au	Assess	BS, STr	1980	-	SS-6
	52E/9 NW	President Mines Ltd.	Au	Assess	GL	1980	-	SS-7
	52E/9 NW	President Mines Ltd.	Au	Assess	Assay	1981	2.3953 2.3715	SS-8
Little Turtle Lake	52C/15 SE	McMillan, Robert L.	Au	Assess	DD 1-310	1981	-	T-1
Long Point Island	52E/8 NE	Neda Gold Mines Ltd.	Au	Non Assess	STr, Property Exam	1935	-	I-1
	52E/8 NE	Regina Mine	Au	Non Assess	Assay	1900	-	H-3
	52E/8 NE	Teck Explorations Ltd.	Au, Cu Ni, Zn	Assess	DD 1-73.5m	1981	-	J-1
Little Turtle Lake	52C/15 SE	Golden Jar Enterprises	Au	MEAP A-36	STr, Tr	1981	-	V-1
MacFie-Avery Twps.	52F/9 NW	Beth Canada Mining	-	Assess	A Mag, AEM	1978-79	2.2818 2.2889	J-3
MacNicol Township	52F/13 SW	Rollmac Exploration Corp. Ltd.	U	Assess	DD 1-706.0	1981	-	BB-5
Manitou Stretch, Kenora District	52F/3 NE	Gates Lake (Noranda)	Au	Non Assess	Property Exam	1973	-	H-2
Manross Township	52E/9 SW	Roberecki, Ed	Au	Assess	Tr	1980	-	O-1
	52E/9 SW	Teck Explorations Ltd.	BM	Assess	Mag, EM, GL	1979	2.3658	P-1
Manross Township/ Code Township	52E/9 SW SE	Wendigo Gold Mines	Au	Non Assess	Property Exam	1934	-	L-4
Melgund Township	52F/9 SW	Lundmark, Harry	Au	Assess	STr	1981	-	Z-1
Napanee Lake	52F/3 NE	Portelance, Robert	Au, Sb	Assess	Tr	1981	-	I-1
Phillips Township	52F/5 SW	Halvorsen, Terence	Au	Assess	Assay, STr, Tr	1981	-	QQ-1
	52E/8 SE	Terrell, Michael	Au	Assess	Tr, GL	1980	2.3669	C-1
Rainy River District	52C/10 NW	Beaupre Option (Noranda)	Cu	Non Assess	GL, Tr, EM	1967	-	R-1
Redvers Township	52K/3 SW	Quibel Molybdenum Property	Mo	Non Assess	Assay, Property Exam	1965	-	A-1
Reed Lake	52C/16 SW	Alice "A" (Noranda)	Au	Non Assess	GL	1926	-	O-1
	52C/16 SW	Miner Property	Au	Non Assess	Property Exam	1936	-	N-1
	52C/16 SW	Sutherland Group (Noranda)	Au	Non Assess	Property Exam, Assay	1937	-	P-1
Reynar Lake	52L/6 NE	Norpax Mines & Oils Ltd.	Ni	Non Assess	Geophys	1962	-	K-3
Rickaby Lake/ Eagle Lake	52L/11 NE 52L/10 NW	Rio Tinto Canadian Exploration Ltd.	BM	Assess	AEM	1980	2.3660	K-1
Rowan Lake Area	52F/5 SE	Monte-Cristo Property (Noranda)	Au	Non Assess	DD 9-2275.7, GL	1973	-	Q-3

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rowan Lake Area	52F/5 SE	Nolan Lake Explorations Inc.	Au	Assess	DD 2-401	1980	-	II-4
	52F/5 SE	Nolan Lake Explorations Inc.	Au	Assess	Tr	1980	-	II-5
	52F/5 SE	Nolan Lake Explorations Inc.	Au	Assess	DD 14-2554.0	1981	-	II-6
	52F/5 SE	Nuinsco Resources Ltd	Au	Non Assess	Press Release	1981	-	JJ-1
Shoal Lake	52E/10 SW	Cedar Island Mine	Au	Non Assess	DD 4-947, Assay	1934	-	B-2
	52E/10 SW	Fairservice, Robert	Au, Cu, Ni	Assess	GL, Tr	1980	2.3671	HH-1
	52E/10 SW	Gold Coin Mine	Au	Non Assess	Tr, STR	1926	-	CC-2
	52E/10 SW	Kenora Mines Ltd.	Au	Non Assess	Pros	1911	-	EE-2
	52E/10 SW	Kenora Prospectors and Miners Ltd.	Au, Ag	Non Assess	Pros	1928, 1931	-	EE-3
	52E/10 SW	Kenora Prospectors and Miners Ltd.	Au	Non Assess	DD 31-2962.83, Assay	1936	-	EE-4
	52E/10 SW	Kenora Prospectors and Miners Ltd.	Au	Non Assess	SA	1925-1930	-	General
	52E/10 SW	Mikado Mine	Au	Non Assess	DD 13-3147.5, Assay	1934, 1936	-	M-3
	52E/10 SW	Mikado Mine (Kenora Prospectors & Miners)	Au	Non Assess	Pros, Assay	1901-1933	-	General
	52E/10 SW	Tycoon Island Mine	Au	Non Assess	DD 2-829	1934	-	U-2
Straw Lake	52F/3 SW	Straw Lake Mining Syndicate (Lucy Prop.)	Au	Non Assess	Property Exam	1958	-	F-1
	52F/3 NW	Straw Lake Beach Gold Mines	Au	Non Assess	Property Exam	1936	-	E-3
Tabor Lake	52F/9 SW	Redden, James Wm. (Sakoose Mine)	Au	Assess	MAG, SD	1979-1980	2.3601	X-2
	52F/9 SW	Redden, James Wm. (Sakoose Mine)	Au	Assess	STr	1980	-	X-3
	52F/9 SW	Redden, James Wm. (Sakoose Mine)	Au	Assess	STr	1981	-	X-4
Tweedsmuir Township	52F/5 SW	Sherritt Gordon Mines Ltd.	Au	Assess	Mag	1980-1981	2.3882	PP-1
Van Horne Township	52F/10 NW	Glatz, Alexander	Au	Assess	Tr, Assay, STR	1980	2.3905	LL-1
Vermilion Bay	52F/14 SW	Martenson Claims (Noranda)	U	Non Assess	SA	1955	-	K-1
Warclub Area	52F/5 NW	Barrie Explor. Co.	BM	Non Assess	DD 1-167	1980	-	J-7
	52F/5 NW	Barrie Explor. Co.	BM	Non Assess	DD 2-378	1980	-	J-8
Wapageisi Lake	52F/8 SW	T. Greenland Prospecting	BM	Non Assess	Prospecting	1955	-	General
Washeibegama Lake	52F/7 NE	Fornieri Claims	Au	Non Assess	Assay, GL	1944	-	F-2
	52F/7 NE	Pelham Gold Mines Ltd.	Au	Non Assess	Assay, Property Exam	1951	-	PF-1
Whitefish Bay	52E/9 SW	Bath Island Mine (Noranda)	Au	Non Assess	Property Exam	1919	-	M-2
Willingdon Township	52E/8 NE	Sherritt Gordon Mines Ltd.	Au	Assess	Mag	1980-81	2.3882	K-1

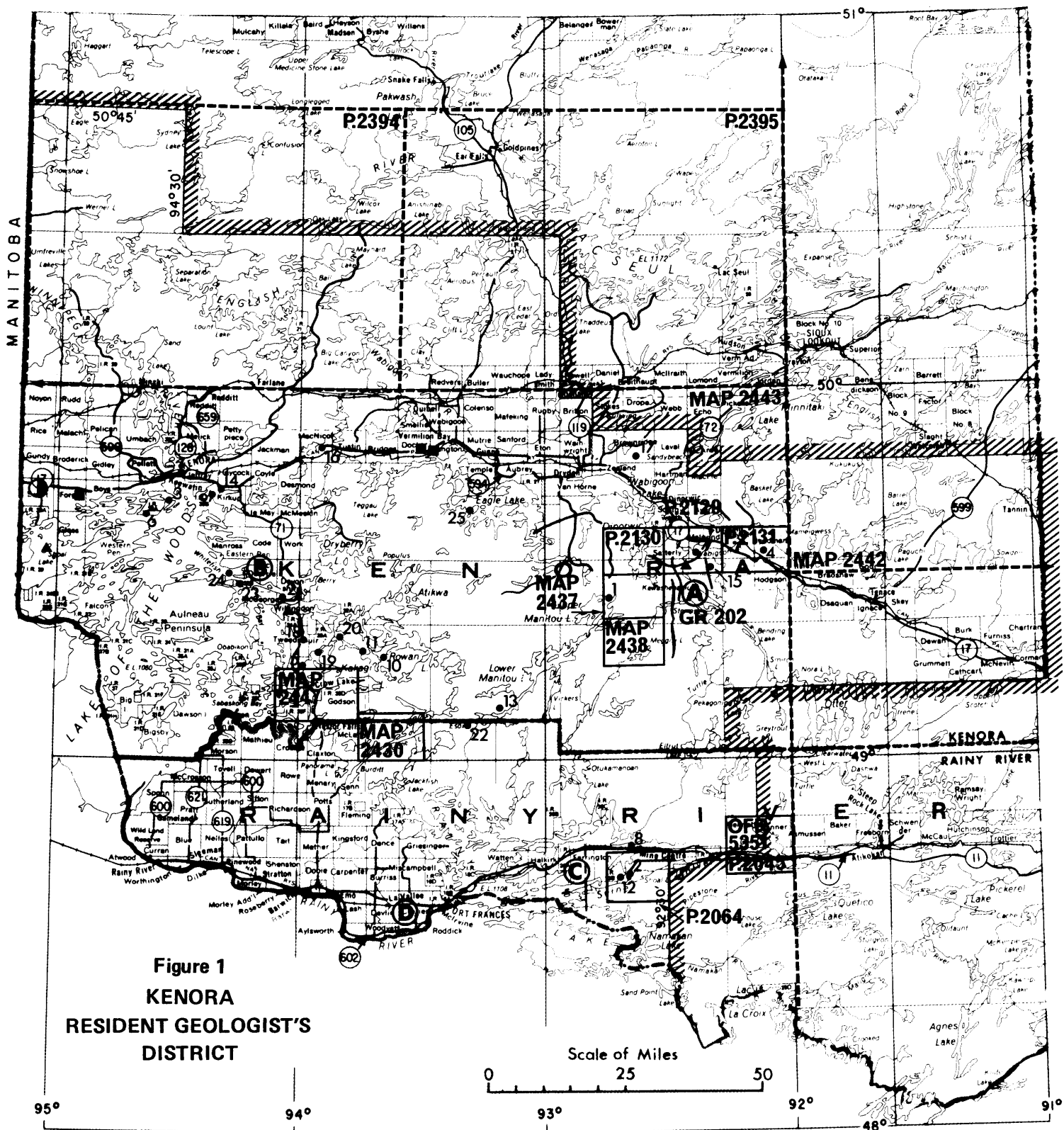
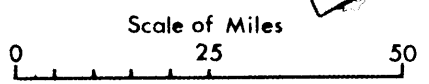


Figure 1
KENORA
RESIDENT GEOLOGIST'S
DISTRICT



EXPLANATION

- Boundary of Resident Geologist's District
- Map or report issued by the Ontario Geological Survey in 1981 (keyed to Table 1)
 - P — Preliminary map
 - OFR — Open File Report
 - GR — OGS Report
 - 2430 — Coloured map
- Mines and/or properties under development
- Location of OGS Field Party in 1981
- Properties under evaluation and/or Exploration in 1981.
- Producing Quarries
- Exploration activities in 1981 (keyed to Table 2)

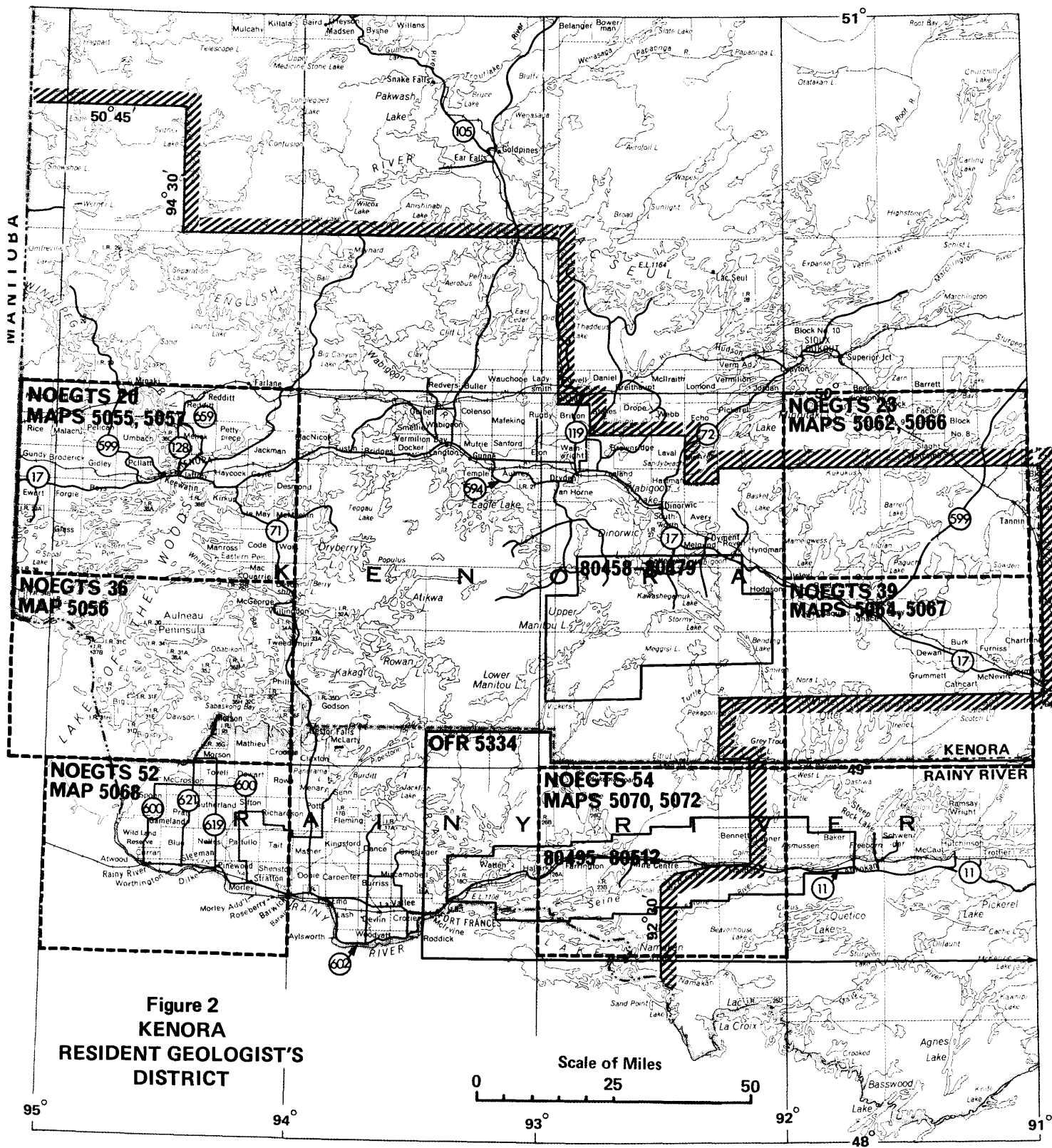


Figure 2
KENORA
RESIDENT GEOLOGIST'S
DISTRICT

Scale of Miles
 0 25 50

EXPLANATION

Boundary of Resident Geologist's District

- Map or report issued by the Ontario Geological Survey in 1981 (keyed to Table 1)
- OFR — Open File Report
- NOEGTS 20 — NOEGTS Report
- 5055 — NOEGTS Map
- 80458 — Federal - Provincial Maps (Geophysical/Geochemical Series)

cepts and/or the Ontario Geological Survey airborne geophysical release has helped outline favourable zones.

A number of individuals and major companies are actively pursuing the custom mill and central mill concept advocated by R. C. Beard (Northern Miner, January 15, 1981).

Two major companies that have acquired numerous gold properties both by staking and optioning patented mining claims, have been actively assessing their holdings during the year. Sherritt Gordon Mines Limited, from its exploration office in Dryden, has been working in the following areas: on its holdings in the Rowan Lake area, centred on the old Caswell-Williams prospect; on the Regina and Neda properties at Sioux Narrows; the Purdex and Electrum Lake prospects at High Lake; and holdings in the Eagle Lake area.

Denison Mines Limited has been assessing its property acquisition at Shoal Lake over the year, where the company holds options on properties owned by Kenora Prospectors and Miners Limited. Deep drilling has been underway on both the Cedar Island and the Mikado Mines, both former producers. More recently, the company has acquired the Wendigo Mine, formerly the largest gold producer in the Kenora Mining Division (67 423 ounces Au). Evaluation of this property is planned for 1982.

In the Rowan Lake area, Nuinsco Resources Limited completed 5681 feet of diamond drilling over 17 holes on its Cameron Lake gold property (Northern Miner, September 17, 1981). Reportedly, the gold-sulphide mineralization occurs within siliceous and sericitic tuffs and carbonate-sericite-rich exhalite interbedded with pillowed and massive basalts, with several discrete gold-bearing horizons. Assay values from key holes average 0.17 ounce Au per ton for a total interval of 147 feet.

In the Bluff Point Lake area, Selco Mining Corporation Limited carried out ground geophysical work, drilling, and surface sampling on its Fairservice gold option.

The airborne electromagnetic-magnetic survey released in January, 1981 (Ontario Geological Survey 1981) precipitated staking and subsequent ground follow-up throughout those areas. As a result, a number of companies have acquired ground in those areas, both in relation to gold and base metal exploration. The opening of the new Fort Frances-Dryden highway, which passes through the Manitou-Stormy Lakes area has also greatly facilitated prospecting and exploration in this hitherto rather inaccessible area. In the spring of 1981 a rather spectacular gold occurrence in a narrow, short, quartz vein was found close to the side of the highway near Sasakwei Lake. Extensive staking over a northeast-trending zone about 13 km long, which includes the old Goldrock camp, and which includes this occurrence, may be at least in part related to the find.

In the late summer, Sulpetro Minerals Limited dewatered the old Tabor Lake Mine in the "New Klondike" area southeast of Dryden. Diamond drilling the previous winter had reportedly confirmed much of the older assay values. In the same area, J. Redden has been working

on his Sakoose Mine property, one of the more interesting past producers, including ground geophysics, shaft dewatering and assay sampling, and surface stripping.

Elsewhere in the Kenora Mining Division, diamond drilling was carried out near the Foley Mine in the Bad Vermilion Lake area; at the Norr-Pen occurrence on Northern Peninsula, Lake of the Woods; on the Saudery prospect, Little Turtle Lake area; and on the Meston and Sullivan prospects near Nolan Lake in the Rowan Lake area.

Surface investigations of a general nature were carried out in the Dinorwic-Kawashegamuk Lake area, the Kakagi Lake area, the Bad Vermilion Lake area, and in the Straw-Lower Manitou Lakes area.

At least one grass-roots gold exploration program was commenced by a major company in the Division, and other majors were investigating the possibility of starting grass roots programs.

Base Metals

Major companies continued their grass roots exploration programs throughout the Division, some of which have been ongoing for a few years. This work has been progressing in the vicinity of Sioux Narrows; Straw Lake; the Bee Lake volcanic-sedimentary belt, 100 km north of Kenora; the Wabigoon Lake area; the general Manitou-Stormy Lakes area; and the Cliff Lake-Cedar Lake area, north of Vermilion Bay.

In the Bee Lake Belt, airborne geophysical assessment work filed by Rio Tinto Canadian Exploration Limited shows their general interest in this area.

Euro-Dollar Development Limited has continued its assessment in the Wabigoon Lake area. Considerable geophysical work and diamond drilling have been done by this company over the last few years, and further work is planned for the coming year.

Teck Explorations Limited has diamond drilled conductive zones in the Long Point Island area near to Sioux Narrows, and the Kaiarskons Lake area, southeast of Kakagi Lake.

Other companies engaged in base-metal programs included Selco Mining Corporation Limited, and Noranda Mines Limited. Beth Canada Mining Company, formerly quite active in Kenora Mining Division, has terminated exploration.

Other Minerals

In Brownridge Township, Selco Mining Corporation Limited continued its exploration of lithium-tantalum pegmatites at Mavis Lake, which has been continuing since 1978. Diamond drilling and litho-geochemical sampling have been applied to extending and developing grade and tonnage figures for both tantalum and lithium. These deposits have been briefly described by F.W. Breaks *et al.* (1978) and Breaks (1980).

Rollmac Exploration Corporation Limited diamond drilled its Kenoratomic uranium property in MacNicol Township, close to the New Campbell Island Mines Limited's uranium property.

Interest resurfaced this year in tungsten deposits in Zealand and Brownridge Townships, close to Dryden, and the adjacent but not necessarily genetically related lithium-tantalum deposits being explored by Selco Mining Corporation Limited.

Heap Leach Test Program

As reported in last year's annual report by Beard and Rivett (1981), a heap leach test program was initiated by the Ministry of Natural Resources to assess the potential for using this simple low cost gold recovery method in Ontario. A preliminary test program was carried out jointly with the Ministry of Northern Affairs to determine if northwestern Ontario gold ores were amenable to heap leaching. Bench tests were carried out by the Ontario Research Foundation on 12 samples representative of ore types from the area.

Assay values for the 12 samples ranged from 0.022 to 0.60 ounce Au per ton.

Of the 12 samples submitted, five showed good penetration and were subjected to column tests to determine recovery. The results of column leaching in terms of recovery, is shown in Table 5.

Stated briefly, four of the five samples tested showed good to excellent recoveries, generally ranging from 75 to 97 percent. All the technical data from this test work is contained in OFR 5358, "Heap Leaching Metallurgical Studies on Several Ontario Gold Ores" (Witte 1981).

It would thus appear that at least some Archean gold ores are amenable to heap leaching.

An incentive program is planned by the Ministry of Natural Resources in 1982, to encourage and assist the private sector in carrying out a test demonstration project in the field.

Property Examinations

In 1981, the following mining properties or mineral occurrences were examined by the Kenora staff as part of the regular program:

Gold:

- Dinosaur Prospect—Bad Vermilion Lake area.
- Edwards-Fairservice Prospect—Bluffpoint Lake area.
- Electrum Prospect—Ewart Township.
- Electrum Pits Occurrence—Ewart Township.
- Flambeau Lake Occurrence—Contact Bay area.
- Gold Creek Occurrence—Kirkup Township.
- Lone Pine Occurrence—Aubrey Township.

- Noranda—Beggs Lake Prospect—Rowan Lake area.
- Pidgeon (Dymont Group) Occurrence—Hyndman Township.
- Purdex Prospect—Ewart Township.
- Sakoose Mine—Tabor Lake area.
- Tabor Lake Mine—Tabor Lake area.

Asbestos:

- Oak Bay Asbestos Occurrence—Wiley Bay area.

The following gold properties were examined as part of the Bigstone Bay project, all in Kirkup or Haycock Townships:

- Earngey Occurrence.
- Eschweiler Occurrence.
- Pine Portage Prospect.
- Split Lake Occurrence.
- Thrasher Occurrence.
- Triumph South Occurrence.

Recommendations for Prospecting and Exploration

Gold Associated With Altered Granitoids

Subsequent to a favourable assay value of 0.54 ounce Au per ton on a single grab sample (Edwards 1980), recent prospecting and exploration in the Bluffpoint Lake area has outlined extensive areas of silicification and sericitization of feldspars within the southernmost trondhjemitic phase of the Lawrence Lake Batholith. Subsequent prospecting by R. J. Fairservice (personal communication), has outlined a number of alteration zones along a linear trend within the trondhjemitic phase that parallels both the margin of the batholith at a distance of 1000 m from it, and the contact of the trondhjemite with diorite and quartz diorite to the north.

Sampling at the original showing, located 900 m north of the east end of Floyd Lake, by Fairservice (personal communication) yielded an average of 0.103 ounce Au per ton from 25 samples. Quartz veins are narrow, on the order of a few centimetres only, composed of clear quartz. Small gossan areas are related to sparsely disseminated pyrite. Two thousand metres to the west, close to the south shore of a small lake, Fairservice (personal communication) obtained an assay of 5.88 ounce Au per ton from a quartz vein with visible gold, whereas samples from the altered trondhjemite yielded assays in the range 0.02 to 0.08 ounce Au per ton.

The linearity of the alteration zones, at a constant distance from the contact of the batholith with enclosing volcanics suggests a genetic control related either to a mineralizing front, or to a metamorphic front, but details are lacking. Other gold occurrences in the vicinity are within the volcanic sequence: of special note is the Straw Lake Beach Mine, that produced 11 568 ounces Au from 33 662 tons milled during the period 1938–1941. Edwards (1980) has emphasized the structural control of

TABLE 5 RESULTS OF COLUMN LEACH TESTS

SAMPLE NUMBER	HEAD ASSAY Au oz/t	AU RECOVERY (from Residue Analysis)	AU RECOVERY (From Solution Analysis)
1	0.04	75%	80.6%
4	0.094	22.3%	10.4%
5	0.567 (0.81)	good	good
11	0.60	91.5%	48.1%
12	0.14	97.1%	80.5%

mineralization related to fracture zones outlined by lineaments, and the role of hydrothermal activity as an agent for concentrating gold.

Other possible similar geologic situations that warrant investigation include the Eagle Lake lobe of the Atikwa Batholith in the Garnet Bay and Buchan Bay areas, where gold occurs well within the granitoid rocks (eg. the Baden Powell Mine: 288 ounces gold from 163 tons milled, 1902-5).

Rare-Element Pegmatites

The association of lithium, tantalum, caesium, and beryllium with complex pegmatites in the boundary zone between the English River and Wabigoon Subprovinces in the vicinity of Zealand through Echo Townships, north-east of Dryden has received considerable attention over the last few years, and seems likely to continue. Breaks *et al.* (1978) and Breaks (1980) have emphasized the association of these pegmatites with metasedimentary migmatites that lie marginal to and are intercalated in part within the Ghost Lake Stock. The confines of this stock are indicated on Preliminary Map P.1971 accompanying Miscellaneous Paper 72 (Breaks *et al.* 1978), and also on the Kenora-Fort Frances compilation map (Blackburn *et al.* 1981). A further search for complex pegmatites in this general area is warranted, both by surface prospecting, and by a lithogeochemical search for bedrock haloes. In an initial assessment of geochemical methods on the property of Tantalum Mining Corporation, Bernic Lake, Manitoba, it was found (Trueman 1978) that Li, Rb, and Cs bedrock haloes generated by blind pegmatite bodies give a potential penetration depth on the order of 500 feet. Selco Mining Corporation Limited have successfully utilized a lithium lithogeochemical technique on their pegmatite properties in the Brownridge Township area (Assessment Files, Kenora Resident Geologist's office).

Ontario Geological Survey Activities

During the 1980 field season, the following field parties from the Precambrian Geology, Mineral Deposits, and Engineering and Terrain Geology Sections operated within the Kenora Mining Division.

D. U. Kresz, under the direction of C. E. Blackburn, completed detailed geological mapping for the Precambrian Section in the Kawashegamuk Lake area, about 30 km southeast of Dryden (Blackburn and Kresz 1981).

G. W. Johns (Precambrian Section) commenced detailed geological mapping in the MacQuarrie-McGeorge Townships area at the east end of the Lake of the Woods greenstone belt, about 30 km south-east of Kenora (Johns 1981).

K. M. Poulsen (Mineral Deposits Section) completed a comprehensive study of the geological setting of mineralization in the Mine Centre-Fort Frances area (Poulsen 1981).

S. Szoke (Engineering and Terrain Geology Section) commenced and completed an aggregate resource study in Crozier, Devlin, Woodyatt, and Roddick Townships, immediately west of Fort Frances (Staff of the Aggregate Assessment Office 1981).

Ontario Mineral Exploration Program (OMEP)

As of the end of November 1981, six designated OMEP programs are in progress in the Kenora Mining Division.

These include G. Armstrong in Halkirk and Farrington Townships; Euro-Dollar Development Limited in Zealand and Van Horne Townships, and the Butler Lake area; A. Glatz in Melgund Township; A.E. Lafreniere in the Little Turtle Lake area; L. H. Moyer in Kirkup Township; and TRV Minerals in the Shoal Lake area.

Research by Other Agencies

University Theses

Geological theses related to the Kenora Mining Division believed to be in progress or completed during 1981, are as follows:

B.Sc.

Caldwell, G. "The Stratigraphy, Petrology and Petrography of the Gibi Lake Metavolcanic Sequence, Northwestern Ontario" (University of Windsor).

M.Sc

Bald, Roberta, "Petrogenesis of Early Archean Ton-alite-Granodiorite from the English River Sub-province, Gundy Lake area, Northwestern Ontario" (University of Manitoba).

Kresz, D. U.,—Commenced a Study of Volcanism and Related Mineral Deposits in the Kawashegamuk Lake Area (Brock University).

Ucakuwun, E. K.—"The Pegmatites and Granitoid Rocks of the Dryden Area, Northwestern Ontario" (University of Manitoba).

Ph.D.

Poulsen, K. H.—Continued a Study of the Geological Setting of Mineralization in the Mine Centre-Fort Frances Area (Queen's University).

Geochronologic Studies

D. W. Davis of the Royal Ontario Museum is continuing analytical work on more than 50 samples taken for zircon U-Pb geochronology throughout the Savant-Crow Lakes greenstone belt. Preliminary results were reported by Davis *et al.* (1980). Refinement of data are to be presented in a paper on the Manitou-Wabigoon Lakes area, currently in press (Davis *et al.*, in press), and two others in preparation, relating to the area Sioux Lookout through Savant Lake, and the Kakagi-Pipestone Lakes portions of the greenstone belt respectively.

Preliminary results (Davis *et al.* 1980) suggested that because metavolcanics of similar types to those at Sturgeon Lake that occupy the Wabigoon, Eagle, Kakagi, and Manitou Lakes areas are also of closely similar age, they are excellent targets for base-metal exploration. In Japan, Kuroko-type base-metal sulphide deposits, similar in many respects to those at Sturgeon Lake, occur at a discrete stratigraphic level, and formed during a short time interval (1 my).

Ontario Geoscience Research Grant Program

G. R. Edwards and R. W. Hodder (University of Western Ontario) concluded an investigation of the temporal relationship between emplacement of felsic plutonic and felsic volcanic phases in an igneous complex at Phinney-Dash Lakes east of Nestor Falls, with special reference to mineralization (Edwards and Hodder, 1981).

Publications Received, 1981

Birk, D., and McNutt, R. H.
1981: Geochronology of Wabigoon Belt Granitoids, Northwestern Ontario: Rb/Sr Isochrons for Seven Late-tectonic Plutons. *Canadian Journal of Earth Sciences*, Vol. 18, p. 157-175.

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1981: Pluton Categorization, TR-36 by Geological Survey of Canada, Energy, Mines and Resources, for Atomic Energy of Canada Limited, 81p.

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Cerny, P., Trueman, D.L., Ziehlke, D.V., Goad, B.E., and Paul, B.J.
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1981: Geochronology of Orthogneiss Adjacent to the Archean Lake of the Woods Greenstone Belt, Northwestern Ontario: a Possible Basement Complex. *Canadian Journal of Earth Sciences*, Vol. 18, p. 94-102.

Coker, W.B.
1981: A Geochemical Orientation Survey for Uranium in MacNicol, Tustin, Bridges, and Docker Townships, District of Kenora, Ontario; Geological Survey of Canada, Paper 79-11, Energy, Mines and Resources Canada. 24p.

Gower, C.F., and Clifford, P.M.
1981: The Structural Geometry and Geological History of Archean Rocks at Kenora, Northwestern Ontario—A proposed Type Area for the Kenoran Orogeny; *Canadian Journal of Earth Sciences*, Vol. 18, p. 1075-1091.

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1980: Oxygen Isotope Evidence for the Origin of Discrete Granitoid Plutons from the Archean Western Wabigoon Belt, Northwestern Ontario, *Precambrian Research*, 14 p.21-30.

McCrack, G.F.D., Misiura, J.D., and Brown, P.A.
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1980: The Stratigraphy, Structure and Metamorphism of Archean Rocks at Rainy Lake, Ontario; M.Sc. Thesis, Lakehead University, 99p.

Ridler, R.H.
1966: Petrographic Study of a Crow Lake Ultrabasic Sill, Keewatin Volcanic Belt, Northwestern Ontario; M.A. Sc. Thesis, University of Toronto, 104p.

Shilts, W.W.
1981: Sensitivity Of Bedrock To Acid Precipitation: Modification By Glacial Processes, Geological Survey of Canada, Paper 81-14, 7p, Accompanied by Maps 1549A, 1550A, and 1551A, Sensitivity of Bedrock and Derived soils to Acid Precipitation, South Central and Southeastern Canada, Scale 1:1 000 000.

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- Blackburn, C.E., Beard, R.C., and Rivett, S.
1981: Kenora—Fort Frances, Geological Compilation Series, OGS Map 2443, scale 1:253 440 (1 inch to 4 miles).
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1981: 1980 Report of the Northwestern Regional Geologist and Kenora Regional Geologist; p.1-16 *in* Annual Report of the Regional and Resident Geologists, 1980, Edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 95, 159p.
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1980: Lithophile Mineralization in Northwestern Ontario, Rare Element Granitoid Pegmatites; p. 5-9 *in* Summary of Field Work, 1980, by the Ontario Geological Survey, Edited by V.G. Milne, O.L. White, R. B. Barlow, J. A. Robertson, and A. C. Colvine, Ontario Geological Survey, Miscellaneous Paper 96, 201p.
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1980: Geochronology of the Savant-Crow Lakes area, Western Wabigoon Subprovince, Districts of Kenora, Rainy River, and Thunder Bay; p. 24-33 *in* Summary of Geochronology Studies 1977-1979, Edited by R. G. Pye, Ontario Geological Survey, Miscellaneous Paper 92, 45p.
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- Edwards, G.R., and Hodder, R.W.
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1980: Geology of the Straw Lake Area, Districts of Kenora and Rainy River; Ontario Geological Survey Open File Report 5292, 125p. Accompanied by one Map, scale 1 inch to ¼ mile.
- Johns, G.W.
1981: MacQuarrie—McGeorge Townships Areas, District of Kenora; P. 22-25 *in* Summary of Field Work, 1981, by the Ontario Geological Survey, Edited by John Wood, O.L. White, R. B. Barlow, and A. C. Colvine, Ontario Geological Survey, Miscellaneous Paper 100, 255p.
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1978: Exploration Methods in the Tanco Mine Area of South-eastern Manitoba, Canada; Energy, Vol. 3, p. 293-297.
- Witte, M. K.
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1981 Report of the Red Lake Resident Geologist

M.E. Durocher¹ and S. van Haften²

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Introduction

The Red Lake Resident Geologist's Office is presently staffed by M. Durocher, Resident Geologist, S. van Haften, Resource Geologist, and C.D. Van Leeuwen, secretary. One Experience '81 student was employed for eight weeks during the summer.

¹Resident Geologist, Ontario Ministry of Natural Resources, Red Lake.

²Resource Geologist, Ontario Ministry of Natural Resources, Red Lake.

Resident Geologist's Activities

As in previous years, a technical advisory service was provided to companies and individuals engaged in mineral exploration within the Red Lake Mining Division. The number of visitors utilizing the available services and facilities totalled about 1 440 during the past year.

Selected mineral properties in the Red Lake, Uchi-Confederation Lakes, Lingman Lake, and Setting Net Lake metavolcanic belts were visited by the staff.

A three year study of the geology and distribution of gold deposits in the Red Lake Belt was initiated. Compilation and synthesis of geological data has commenced, and several properties were sampled for petrographic and geochemical studies.

A Precambrian geology seminar involving Ontario Geological Survey and Ministry of Natural Resources geologists was held in Red Lake in February. More than 40 representatives from industry, and prospectors attended the presentations.

The Resident Geologist and Henry Wallace of the Ontario Geological Survey jointly led a two-day field trip in the Red Lake metavolcanic belt during August. Forty Five representatives from government and industry participated in the field trip.

Assistance and technical comments were provided for several ministry programs and land use studies, including the Red Lake District Land Use Plan.

Visits were made to the four producing mines in the Red Lake Mining Division.

Assistance and logistical support were extended to the six Ontario Geological Survey field parties active in the Red Lake Mining Division in 1981.

Lectures were organized for a local student group and Junior Rangers.

Mining Activity

Four mines were in production during 1981 (see Figure 2). A summary of the main developments of the various operations follows. The cooperation of the mine manager of each operation is gratefully acknowledged.

Campbell Red Lake Mines Limited

Campbell Red Lake operated throughout 1981. The company has completed its three-year expansion program which involved capital expenditures underground, in the mill, and in the townsite. Underground exploration in 1981 has been directed at extending known ore zones and maintaining ore reserves. The mill capacity is now at 1 075 t.p.d. up from 825 t.p.d. in 1980. Sixteen housing units were completed in 1981. Also, the company is currently constructing a large indoor recreational complex in Balmertown. The mine manager is S.M. Reid.

Dickenson Mines Limited

Dickenson Mines Limited, including Robin Red Lake Mines Limited, operated throughout 1981. The company has completed the first phase of its expansion program which involved capital expenditures underground, on surface, and in the townsite. Underground exploration work in 1981 consisted of diamond drilling, drifting, and raising to develop new stopes in known ore zones. The mill capacity has been increased to 700 t.p.d. up from 500 t.p.d. in 1980. Eight housing units in Balmertown were completed this year. The second phase of the company's expansion program which will increase production to 1 000 t.p.d. is scheduled to be completed by 1983 (Northern Miner, December 10, 1981). R.P. Tapper is mine manager.

Selco Mining Corporation Limited

The South Bay Division of Selco Mining Corporation Limited, continued to operate its zinc-copper-silver mine

located in the southeastern part of Dent Township until May 1981 when the mine ceased operation due to exhaustion of ore reserves. The mine has since been allowed to flood, and reclamation of the tailing ponds is in progress. The mill has been moth-balled for an indefinite period of time.

The Griffith Mine

The Griffith Mine, a wholly owned subsidiary of the Steel Company of Canada Limited and managed by Picklands Mather and Company, is situated at Bruce Lake 50 km southeast of Red Lake. During 1981, total ore, waste, and overburden removed in open pit mining was 12.4 million tons: 1 510 000 tons of (natural) pellets were produced. The company has completed the buttress dyke construction in the south pit, and is continuing to rehabilitate and revegetate the tailings area. J.D. Jeffries is mine manager.

Exploration Activity

Exploration activity remained high during 1980 in the Red Lake Mining Division.

Claims recorded during the first eleven months of 1981 decreased by 21 percent as compared with 1980 (Table 1), but the number of active claims increased by 12 percent as compared to 1980. Between January 1 and December 1, 1981, 103 350 man days of assessment work were filed, as compared to 71 975 days in 1980 an increase of 44 percent.

TABLE 1 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT RECEIVED
RED LAKE MINING DIVISION*

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Other (Man Days)	Total All Work (Man Days)
1981**	1,747	1,311	4,808	28,771	62,920	7,342	4,317	103,350
1980	2,220	1,115	4,301	38,482	30,240	871	2,382	71,975
1979	1,068	1,763	3,221	21,108	38,380	3,154	307	62,949
1978	1,207	1,521	3,916	25,574	19,496	2,480	3,447	50,997
1977	2,324	2,395	4,261	12,994	45,080	620	502	59,196
1976	2,705	1,382	4,332	18,680	23,578	380	3,906	46,544
1975	1,368	2,059	2,957	29,377	12,714	960	1,666	44,717
1974	1,339	1,829	3,648	47,362	5,666	3,040	1,657	57,719
1973	1,616	3,157	4,009	60,027	20,474	nil	2,518	83,019
1972	2,219	5,284	5,588	34,261	14,858	5,216	1,838	56,173
1971	1,541	4,922	8,486	73,019	50,920	2,243	1,384	127,566
1970	3,971	7,194	11,759	73,866	329,065	17,606	6,990	427,527
1969	10,999	933	14,772	49,212	66,032	1,320	2,475	119,039
1968	2,451	1,702	4,784	15,367	48,800	1,228	nil	65,395

* Data for 1981 obtained from Mining Recorder's Monthly Business Reports
Data for 1968-1980 obtained from Mining Recorder's Summaries for Annual Reports

** January 1, 1981 - December 1, 1981

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TABLE 2 | MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

<p><u>Ontario Geological Survey Reports</u></p> <p>GR 186</p> <p><u>Open File Reports</u></p> <p>OFR 5333 OFR 5340 OFR 5343</p> <p><u>Preliminary Maps - Geological Series</u></p> <p>P. 2385 P. 2407 P. 2386 P. 2408 P. 2387 P. 2394 P. 2395</p> <p><u>Preliminary Maps - Data Series</u></p> <p><u>Aggregate Resources Publications</u></p> <p>P. 2398</p> <p><u>Federal - Provincial Maps</u></p>	<p><u>Coloured Maps</u></p> <p>Map 2442</p> <p><u>Northern Ontario Engineering Geology Terrain Studies Report</u></p> <p><u>Northern Ontario Engineering Terrain Studies Maps</u></p> <p><u>Mineral Resources Branch Publications</u></p> <p><u>Miscellaneous Reports</u></p> <p><u>Geological Survey of Canada Open File Reports</u></p>
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TABLE 3 | EXPLORATION ACTIVITY DURING THE YEAR.

The following is a list of individuals and companies known to be engaged in exploration within the Red Lake Mining Division in 1981, and the type of work undertaken in each case. See Figures 1 and 2.

Number on Figure	Individual or Company	Activity
1	Aladin Minerals Limited	Diamond drilling in Corless Township.
2	Amoco Canada Petroleum Company	Geophysics, and diamond drilling in the Lingman Lake area.
3	Biron Bay Resources Limited	Geophysics in Ball Township.
4	Bluestack Resources Limited	Geophysics, and trenching in McDonough Township.
5	Campbell Red Lake Gold Mines Limited	Diamond drilling in Balmer Township.
6	Canoxy	Exploration in the Sandy Lake area.
7	Carlson, A.	Prospecting in Mulcahy Township.
8	Cominco Ltd.	Diamond Drilling in Bateman Township and exploration in Baird Township.
9	Desmeulles, G.	Prospecting in the Shabumeni and Favourable Lakes areas.
10	Desmeulles, M.	Prospecting in Heyson Township, Shabumeni Lake area, and "Sandy Creek area".
11	Dickenson Mines Limited	Geophysics and diamond drilling in Balmer and Byshe Townships. Exploration in Todd, Bateman, Dome and McDonough Townships.
12	Dome Exploration (Canada) Limited	Geophysics and diamond drilling in Bateman Township.
13	Frahm, R.	Prospecting in the Springpole Lake area.
14	Frank, R.A.	Trenching in Dent Township.
15	Gay, E.	Geophysics in Byshe Township and in the Sandy Lake area.
16	Geary, A.	Prospecting in the Setting Net Lake area.
17	Getty Mines Limited	Diamond drilling in the Setting Net Lake area, and in Balmer Township.
18	Gold Fields Resources Canada Limited	Diamond drilling in Dome Township, geological mapping and geophysics in Dome, Fairlie, Ball, Byshe, Balmer, and McDonough Townships, and in the South of Otter Lake area.
19	Hagar, A.	Prospecting in Dedee Lake, and Favourable Lake areas.
20	Harvey, C.	Prospecting in McDonough Township.
21	Hermiston, W.	Prospecting in Mulcahy and Ball Townships and in the Dedee Lake area.
22	Juby, M.	Prospecting in the Dixie Lake area.
23	Koezur, K.	Prospecting in the Birch Lake area.
24	Kostynuk Bros.	Diamond drilling in Dome township, and prospecting in the Birch Lake area.

TABLE 3 Continued

Number on Figure	Individual or Company	Activity
25	Later, W.	Prospecting in Shaver Township.
26	Long Lac Mineral Explorations Limited	Diamond drilling in Earngey Township.
27	McNerney, W.	Prospecting in the Setting Net Lake area.
28	Meekis, D.	Prospecting in the Cobham River area.
29	Minorex Limited	Geology, and geophysics in Goodall, Fairlie and Heyson Townships. Diamond drilling in Ball, Goodall, and Fairlie Townships.
30	Mt. Jamie Mines Limited	Geology and geophysics in Todd Township.
31	Newest Red Lake Exploration Corporation	Exploration in Todd Township.
32	Noranda Exploration Company Limited	Geophysics and diamond drilling in Baird and Heyson Townships, and in Birch and Casummit Lakes area.
33	Northgate Explorations	Geology in Todd and Earngey Townships.
34	Nowell, J.	Geophysics in Fairlie and Baird Townships
35	Patino Mines Ltd.	Exploration in Dent and Mitchell Townships
36	Peterson, C.W.	Prospecting in Heyson Township.
37	Punters Explorations	Geophysics and diamond drilling in Balmer Township.
38	Redcon Gold Mines Limited	Diamond drilling in Balmer and Bateman Townships.
39	Rivard, O.	Diamond drilling in Todd Township.
40	Sabina Industries	Geochemistry in Bateman Township.
41	Selco Mining Corporation Limited	Geophysics in Dome, Baird, Heyson, and Fairlie Townships. Diamond drilling in Belanger, Heyson, and Baird Townships.
42	Sherritt Gordon Mines Limited	Geology, geophysics, and trenching in Fairlie Township. Exploration in the Shabumeni Lake area and in Dent Township.
43	Soltermann, R.	Prospecting and diamond drilling in Todd Township.
44	St. Joseph Explorations Ltd.	Geophysics in Agnew, Mitchell, Dent, and Earngey Townships. Diamond drilling in Agnew Township and in the Slate Lake area.
45	St. Mary's Exploration Limited	Exploration in Skinner Township.
46	Stoops, O.	Prospecting in the Keigat Lake area.
47	Strilchuk, G.	Prospecting in Skinner Township.
48	Stupack, W.	Trenching and diamond drilling in Ball Township.
49	Sulpetro Minerals Limited	Geology and geophysics in Bowerman and Belanger Townships. Diamond drilling in Mitchell and Bowerman Townships and in the Slate Lake area.
50	Teck Explorations Ltd.	Geophysics in Bateman Township.
51	Tukkanen, V.	Prospecting in Todd Township.
52	Wilanour Resources	Geophysics, geology, diamond drilling and underground development in Dome and Heyson Townships. Geology and geophysics in Ball and Mulcahy Townships.
53	Wood, R.	Prospecting in Ball and Todd Townships.

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TABLE 4

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED. IN 1981

RED LAKE MINING DIVISION

Assess -Assessment Work
 BM -Base Metal
 DDH -Diamond - Drill Hole
 EM -Electromagnetic Survey
 Geochem -Geochemical Survey
 GL -Geological Survey

Abbreviations

HLEM -Horizontal Loop Electromagnetic Survey
 MEAP -Mineral Exploration Assistance Program
 Mag -Magnetometer Survey
 SA -Sampling, Assays
 Tr -Trenching
 VLF -Very Low Frequency

Mineral and Metal Symbols

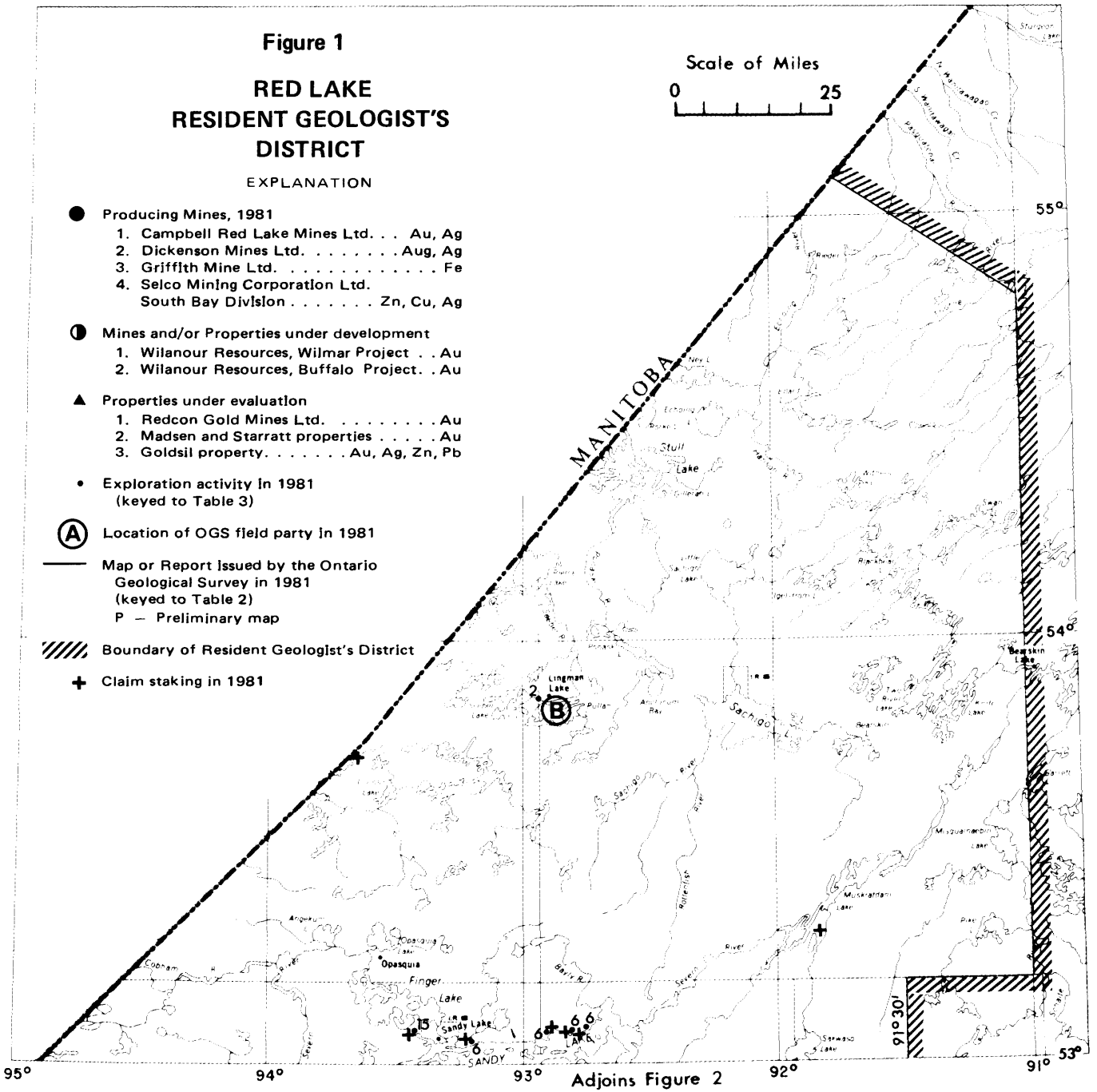
Au -Gold

Ag -Silver

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Agnew Tp.	52N/2	St. Joseph Explorations Ltd.	BM	Assess	Mag, EM	1980	2.3339	Agnew Tp.
Agnew, Mitchell, Tps. Uchi Lake and Earngey Tp.	52N/2	St. Joseph Explorations Ltd.	BM	Assess	Mag, EM	1980	2.3487	52N/SE
Aljo Lake	53J/11	Hunt, Charles Warren	Au	Assess	Geochem, SA	1979	2.3134	53J/NW
Baird Tp.	52K/13	Selco Inc.	BM	Assess	Mag, EM	1981	2.3873	Baird Tp.
Baird, Fairlie Tps.	52K/13 52N/4	Nowell, Joseph	BM	Assess	Mag	1981	2.3748	Fairlie Tp.
Baird, Fairlie Tps.	52K/13 52N/4	Selco Inc.	BM	Assess	Mag, EM	1980	2.3747	Baird Tp.
Baird, Dome, Heyson Fairlie Tps.	52K/3 52N/4	Selco Mining Corporation Limited	BM	Assess	Mag, EM	1980	2.3653	Heyson Tp.
Ball Tp.	52M/1	Dome Exploration (Canada) Ltd.	Au	Assess	DDH(2) 1447'	1981	-	Ball Tp.
Ball Tp.	52M/1	Dome Exploration (Canada) Ltd.	Au	Assess	DDH(1) 407'	1981	-	Ball Tp.
Ball Tp.	52M/1	Dumont Nickel	Au	MEAP RL-86	Mag	1980	-	Ball Tp.
Ball Tp.	52M/1	Minorex Ltd.	Au	Assess	DDH(1) 425'	1981	-	Ball Tp.
Ball Tp.	52M/1	Stupack, William	Au	Assess	DDH(1) 203'	1981	-	Ball Tp.
Balmer Tp.	52N/4	Beth-Canada Mining Co.	Au	Assess	DDH(1) 446'	1980	-	Balmer Tp.
Balmer Tp.	52N/4	Dickenson Mines Ltd.	Au/Ag	Assess	DDH(2) 569'	1980	-	Balmer Tp.
Balmer Tp.	52N/4	Dickenson Mines Ltd.	Au	Assess	Mag, HLEM	1980	2.3345	Balmer Tp.
Balmer Tp.	52N/4	Dickenson Mines Ltd.	Au	Assess	DDH(1) 351'	1981	-	Balmer Tp.
Balmer Tp.	52N/4	Dickenson Mines Ltd.	Au	Assess	Mag, HLEM	1980	2.3302	Balmer Tp.
Balmer, Bateman Tps.	52N/4	Hall, Evald M.	Au	Assess	Mag	1980	2.3560	Balmer Tp.
Bateman Tp.	52N/4	Betos Management Ltd.	Au	Assess	Mag	1980	2.3323	Bateman Tp.
Bateman Tp.	52N/4	Dome Exploration (Canada) Ltd.	Au	Assess	DDH(3) 1,216'	1980	-	Bateman Tp.
Bateman Tp.	52N/4	Dome Exploration (Canada) Ltd.	Au	Assess	Mag, EM	1980	2.3659	Bateman Tp.
Bateman Tp.	52N/4	Teck Explorations Ltd.	Au	Assess	EM	1981	2.3848	Bateman Tp.
Bateman, McDonough Tps.	52N/4	Asarco Exploration Company of Canada Limited	BM	Assess	Mag, HLEM	1980	2.3586	Bateman Tp.
Belanger Tp.	52K/15	Selco Mining Corporation Limited	BM	Assess	DDH(2) 340'	1980	-	Belanger Tp.
Birkett Tp.	52N/1	Lee, Norman	Au	Assess	Tr.	1980	-	Birkett Tp.
Bowerman Tp.	52K/15	Sulpetro Minerals Ltd.	Au	Assess	DDH(2) 820'	1981	-	Bowerman Tp.
Bowerman, Mitchell Tps.	52K/15 52N/2	Selco Mining Corporation Ltd.	BM	Assess	DDH(2) 320'	1980	-	Bowerman Tp.
Byshe Tp.	52K/13	Gay, Edward	Au	Assess	Mag, EM	1981	2.3884	Byshe Tp.
Casummit Lake	52N/8	Frahm, Randall	Au	Assess	Tr.	1981	-	52N/SE
Casummit Lake	52N/8	Noranda Exploration Company, Limited	Au	Assess	DDH(5) 1504'	1981	-	52N/SE
Cleveland, Grist Lakes	53C/4,5	Cominco Ltd.	BM	Assess	HLEM	1977/78	2.3033	53C/SW

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Corless Tp.	52N/2	Knappett, Rodney	Au	Assess	DDH(12) 1,931'	1981	-	Corless Tp.
Dent Tp.	52N/4	Frank, Raymond, A.	Au	Assess	Tr.	1981	-	Dent Tp.
Dent Tp.	52N/4	St. Joseph Explorations Limited	BM	Assess	Mag, EM	1981	2.3361	Dent Tp.
Dome Tp.	52N/4	Dome Exploration (Canada) Ltd.	Au	Assess	DDH(3) 1,484'	1980	-	Dome Tp.
Dome Tp.	52N/4	Kostynuk, A.	Au	Assess	DDH(2) 211'	1981	-	Dome Tp.
Dome Tp.	52N/4	Wilanour Resources	Au	MEAP RL-80	Mag, EM, GL	1980	-	Dome Tp.
Dome Tp.	52N/4	Wilanour Resources	Au	Assess	DDH(1) 632'	1981	-	Dome Tp.
Dome, Heyson Tps.	52N/4 52K/13	Selco Inc.	BM	Assess	DDH(1) 60'	1981	-	Heyson Tp.
Fairlie Tp.	52K/4	Desmeulles, M.	Au	Assess	Tr.	1981	-	Fairlie Tp.
Fairlie Tp.	52K/4	Minorex Limited	Au	Assess	Mag, EM	1980	2.3753	Fairlie Tp.
Goodall Tp.	52N/2	Minorex Limited	Au	Assess	DDH(5) 765'	1981	-	Goodall Tp.
Gerry, South of Otter Lakes	52K/14	Selco Inc.	BM	Assess	DDH(3) 1,520'	1981	-	52K/NW
Hammell Lake	52M/1	Rivard, O'Brien	Au	Assess	Mag	1980	2.3492	52M/SE
Hammell Lake	52M/1	Rivard, O'Brien	Au	Assess	DDH(1) 240'	1981	-	52M/SE
Heyson Tp.	52K/13	Harbinger Exploration Limited	Au	MEAP RL-84	VLF-EM, DDH(1) 141'	1980	-	Heyson Tp.
Heyson Tp.	52K/13	Minorex Limited	Au	Assess	Mag, EM	1980	2.3677	Heyson Tp.
Heyson Tp.	52K/13	Peterson, C.W.	Au	Assess	Tr.	1980	-	Heyson Tp.
Karas Lake	52K/14	Selco Inc.	BM	Assess	DDH(2) 140'	1979/80	-	52K/NW
Karas, South of Otter Lakes	52K/14	Selco Inc.	BM	Assess	DDH(2) 120'	1980	-	52K/NW
Killala Tp.	52L/16	Gay, Edward	Au	Assess	Tr, GL, SA	1980	-	Killala Tp.
Kippen, West of Kippen, Namaybin Lakes, Rottenfish River	53F/1,8 53G/5	Gulf Minerals Canada Limited	BM	Assess	Mag	1980	2.3463	53F/SE
Lingman, North of Lingman Lakes	53F/15	Amoco Canada Petroleum Co., Ltd.	Au	Assess	DDH(6) 3,134'	1981	-	53F/NE
Little Bear and Knott Tp.	52N/2	Powley, Marvin S.	Au	Assess	DDH(1) 123'	1980	-	Knott Tp.
McVicar Lake	52O/11	Cominco Ltd.	BM	Assess	DDH(6) 2,233'	1980/81	-	52O/NW
Mitchell Tp.	52N/2	Selco Mining Corporation Limited	BM	Assess	Mag, HLEM	1980	2.3286	Mitchell Tp.
Mitchell Tp.	52N/2	St. Joseph Explorations Ltd.	BM	Assess	Mag, HLEM	1980	2.3340 2.3341	Mitchell Tp.
Satterly Lake	52N/8	Cominco Ltd.	Au	Assess	Mag, GL, Tr	1981	2.3732	52N/SE
Setting Net Lake	53C/13	Denison Mines Ltd.	Au	Assess	Geochem	1979	2.3380	53C/NW
Slate Lake	52K/15	St. Joseph Explorations Ltd.	BM	Assess	Mag, HLEM DDH(1) 450'	1980 1980	2.3331 -	52K/NE
Slate Lake	52K/15	Sulpetro Minerals Ltd.	BM	Assess	DDH(2) 760'	1981	-	52K/NE
South of Otter Lake	52K/14	Selco Inc.	BM	Assess	DDH(10) 3,910'	1980	-	52K/NW
Todd Tp.	52M/1	Dome Exploration (Canada) Limited	Au	Assess	DDH(2) 914'	1980	-	Todd Tp.
Willans Tp.	52K/13	Dome Exploration (Canada) Limited	Au	Assess	DDH(1) 1,427'	1980	-	Willans Tp.



Adjoins Figure 1

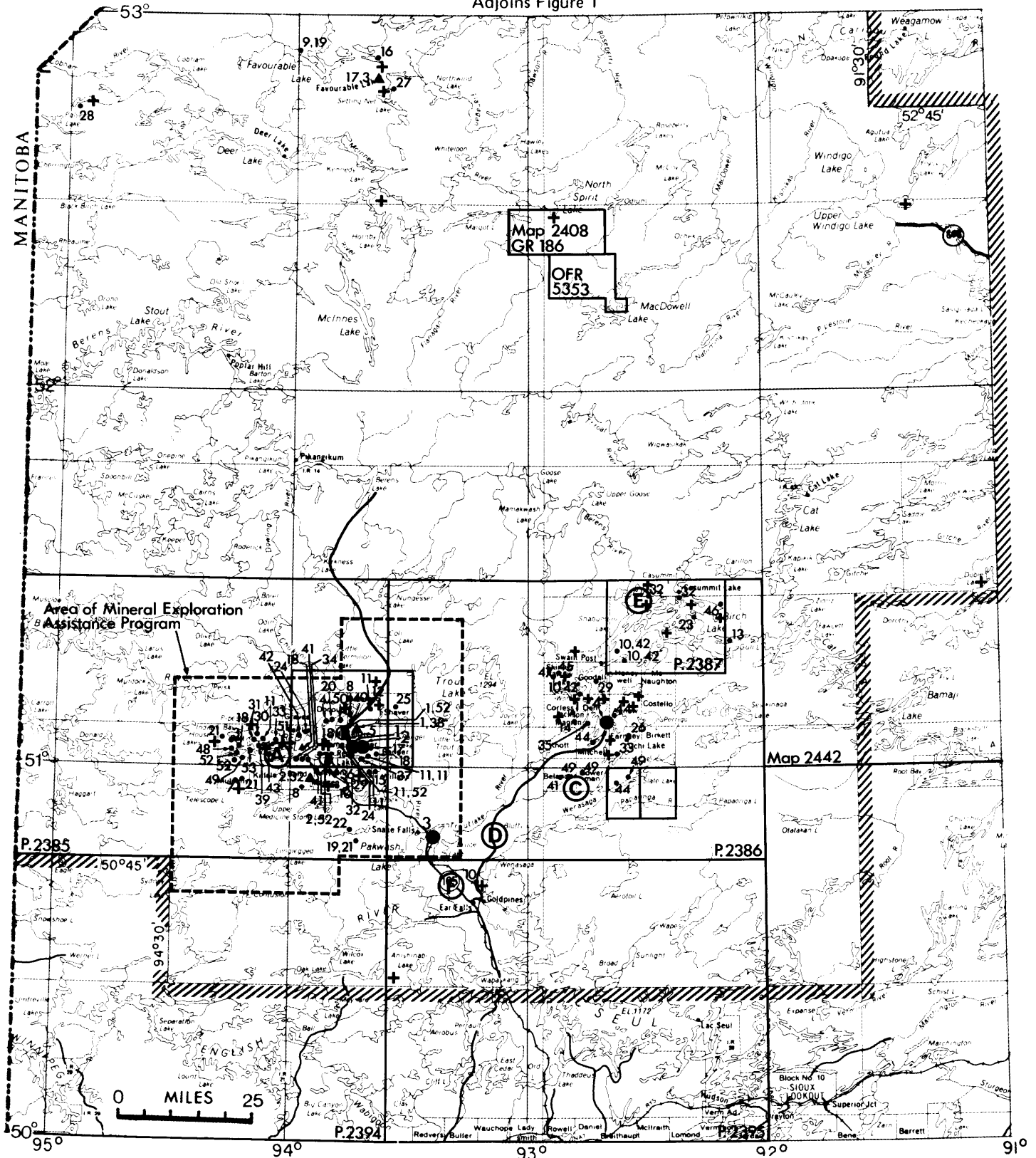


Figure 2

Much of the exploration activity was concentrated in the Red Lake Metavolcanic Belt, with lesser amounts of exploration taking place in the Uchi-Confederation Lakes, Birch Lake, Favourable Lake, Sandy Lake, and Lingman Lake metavolcanic belts (Figures 1 and 2).

No new orebodies were discovered in 1981, but several past producers and promising prospects are being re-evaluated.

Getty Mines Limited is re-evaluating the Berens River Mine, a former gold-silver producer located in the Favourable Lake Metavolcanic Belt. The former producer is presently owned by Zahavy Mines Limited. Getty Mines Limited has completed an airborne magnetic and electromagnetic survey over the area, and has done at least 31 572 feet of diamond drilling in 41 holes (Northern Miner, June 18, 1981).

Noranda Exploration Company Limited is re-evaluating the Madsen and Starratt Olsen properties in Baird Township. The company acquired the Madsen properties in 1980 and the Starratt property in 1981. Work being carried out includes studying of old records, reviewing geology, conducting geophysical surveys and diamond drilling (Northern Miner, March 12, 1981).

Wilanour Resources Limited continued to be very active in 1981. Feasibility studies and bulk testing of the Buffalo orebody in Heyson Township, and the Wilmar granodiorite zone in Dome Township were initiated and are currently in progress. Re-evaluation of the Consolidated Marcus property, and the Cochenour Willans property are also underway. The company's programs have involved capital expenditures underground, on surface, and in the Cochenour and Red Lake townsites.

Properties Visited

In 1981, the following mining properties were visited by the Red Lake Resident Geologist's staff:

Base Metals:

- 1) Copper Lode "A" zone, 1 mile west of Fredart Lake.
- 2) Setting Net Lake molybdenum occurrence.

Gold:

- 1) Alcourt property, Fairlie Township.
- 2) Buffalo property, Heyson Township.
- 3) Faulkenham Lake, Heyson Township.
- 4) Heath property, Todd Township.
- 5) Hill-Sloan-Tivy Vein, Earney Township.
- 7) Luxor Red Lake property, McDonough Township.
- 8) MacAndrew property, Dome Township.
- 9) Showing north of McKenzie Red Lake Gold Mines Limited, claims 82, 83 and 85, Dome Township.
- 10) Madsen-Starratt Olsen properties, Baird Township.

- 11) Miles property, Ball Township.
- 12) New Faulkenham Lake prospect, Baird Township.
- 13) Piper Red Lake prospect, Ball Township.
- 14) Redcon Gold Mines property, Balmer Township.

Mineral Exploration Assistance Program

Since the program was initiated in August 1971, the Ontario Government's Mineral Exploration Assistance Program (MEAP) has provided \$814 625.91 for 88 contracts approved within the MEAP boundaries as shown in Figure 2 (Burr *et al.* 1981).

The MEAP program ended March 31, 1981, but has been replaced by the Ontario Mineral Exploration Program (OMEP) that began on September 1, 1980. Eight OMEP designated programs were in progress on August 31, 1981.

Ontario Geological Survey Activities

The following projects were carried out by the Ontario Geological Survey in 1981 (for location of projects see Figures 1 and 2).

The Red Lake Synoptic Project was continued during the 1981 field season. The project involves integration of all previous geological data with the objective of producing 1:50 000 scale geological maps and a synoptic report summarizing stratigraphy, structure, and economic geology of the Red Lake belt. As part of the synoptic project, Baird Township was mapped at a scale of 1:10 480 (Wallace 1981).

Field work for the Western Uchi Sub-Province synoptic project was carried out in 1981. The objective of this project is to produce a stratigraphic synthesis of the Uchi-Confederation Metavolcanic-Metasedimentary Belt and its relationship to the Red Lake Belt (Thurston 1981).

The bedrock geology of Bowerman and Belanger Townships was mapped at a scale of 1:15 840 (Muir 1981).

The bedrock geology of the Lingman Lake greenstone belt was mapped during 1981 (Wilson 1981).

A molybdenum deposit in the Mink Lake Stock was mapped in detail, and molybdenum occurrences at Setting Net Lake were examined at a reconnaissance level (Marmont and Colvine 1981; Colvine and Marmont 1981).

The surficial geology of the Ear Falls and Pakwash areas was mapped at a scale of 1:50 000 (Ford 1981).

For additional information on the above listed projects, the reader is invited to consult the Summary of Field Work, 1981, by the Ontario Geological Survey (Ontario Geological Survey Miscellaneous Paper 100).

Research by Other Agencies

In conjunction with the Ontario Geological Survey's Geoscience Research Grant Program, C.J. Hodgson and P.J. MacGeehan of Queen's University continued to study the gold mineralization at the Campbell Red Lake and Dickenson Mine properties. This year's work delineates synvolcanic and various stages of metamorphogenic alteration and mineralization. Some of the results of this research are presented in Ontario Geological Survey Miscellaneous Paper 98.

Work by former Queen's University student David Rigg (1980) forms a basis for some of the work by Hodgson and MacGeehan. Brian Christie of Queen's University is studying the "Veinlet Zone" of the Campbell Red Lake Mine.

Richard Kusmirski (1981) of McMaster University studied the metallogeny of the "East South C" ore zone in the Dickenson Mine.

In conjunction with the Ontario Geological Survey's Geoscience Research Program, I.H. Campbell, *et al.* (1981) studied rare earth elements in felsic volcanic rocks, including some material from the South Bay Mine. The purpose of this study was to determine whether rare earth element patterns can be used to discriminate between barren and ore-bearing felsic rocks. Preliminary results suggest that ore-bearing felsic volcanic rocks have flat REE patterns with pronounced Eu anomalies, whereas barren felsic volcanic rocks show strong LREE enrichment patterns and Eu anomalies are weak or absent.

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1981 Report of the Sioux Lookout Resident Geologist

D.A.Janes¹ and R.B.Huggins²

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Introduction

The Sioux Lookout office is staffed by D. A. Janes, Resident Geologist, Ralph Huggins, Resource Geologist and Ms. M. Sawtelle, Geological Secretary.

Exploration for base metals continued at a reduced level during 1981, with activity in the Houghton-Hough Lakes area, and with some minor activity in Echo Township.

The lower level of base-metal activity has been compensated for by increased gold exploration at many locations throughout the Patricia Mining Division. Extensive grass-roots programs are underway in Pickle Lake, Minnitaki Lake, Kashaweogama Lake-Savant Lake, and in the Sturgeon Lake area. In addition, a recent announcement of a gold discovery in the Opapimiskan Lake area has resulted in the staking of large claim blocks in the North Caribou Volcanic Belt.

Resident Geologist's Activities

The two operating base-metal mines in the mining division, the Thierry Mine of UMEX and the Mattabi Sturgeon Lake operation, were visited on several occasions during the year. Many visits were made to the Goldlund and Windfall sites. Ralph Huggins concluded the geological mapping project of Southeast Bay of Minnitaki Lake that was initiated in 1980. D.A. Janes visited and examined 15 properties on Savant, Kashaweogama, and Squaw Lakes. In addition, a reconnaissance study was done on the North Caribou Volcanic Belt in order to assess the gold potential of this area. Several property visits were made to the tantalum pegmatite area at Gullwing Lake. A compilation of hazardous mine sites within the Patricia Mining Division was done by a contractor.

Considerable time and effort were spent on Phase I and II of the West Patricia Land Use Plan. Office personnel visited two Junior Ranger Camps, gave lectures, and conducted field visits. Several lectures were given to Primary School students on the geology of the area and two Science Fairs were judged by the Resident Geologist.

Mining Activity

Three mines remained in production in 1981. The Thierry Mine of UMEX in Pickle Lake continued operations in its

NORTHWESTERN — SIOUX LOOKOUT

TABLE 1

EXPLORATION ACTIVITY DURING THE YEAR.

Number on Figure	Individual or Company	Activity
1	Armstrong, George & Allan Best	Diamond drilling in the Fourbay Lake area.
2	Belore Mines Limited	Ground magnetometer survey in the Greenbush Lake area.
3	Braeswood Exploration Limited	Ground magnetometer, electromagnetic surveys in Kabik Lake & Pickerel Township area.
4	Canadian Nickel Co. Ltd.	Diamond drilling in the Beardy Creek and Nemeigusabins Lake area.
5	Canadian Occidental Petroleum	Diamond drilling in the Nemeigusabins Lake area.
6	Cominco Limited	Diamond drilling in Kawashe Lake, Meen Lake and Drum Lake areas. Magnetometer survey in Meen Lake area and geochemical, geophysical geological surveys, with trenching line and cutting in the Kabik Lake & Pickerel Township area.
7	Corporation Falconbridge Copper	Ground magnetometer & electromagnetic (using Crone Radem VLF) Surveys, and line cutting in Fourbay Lake area and diamond drilling in the Quest Lake area.
8	Denison Mines Limited	Geological, geochemical (humic gold soil sampling of A ₀ or A ₁ soil horizon) channel samples. Geophysical (magnetometer, EM-16 electromagnetic) surveys, trenching, stripping, line cutting, claim staking and diamond drilling in Drayton Township area.
9	Dome Exploration (Canada) Ltd.	Diamond drilling in the Zeemel Lake area.
10	Gallant Mines Limited	Diamond drilling in the Pickle Lake area.
11	Goldlund Mines Limited	Bore hole soil sampling, diamond drilling in Echo Township.
12	Hadley, Eric	Diamond drilling in the Evans Lake area.
13	Mattagami Lake Mines Ltd.	Diamond drilling and ground VLF - electromagnetic survey in the Six Mile Lake area.
14	Moran Resources Corporation	Claim staking, line cutting, geological mapping in the Sturgeon Lake area.
15	Nahanni Mines Limited	Diamond drilling, geological survey in the Kabik Lake & Pickerel Township area.
16	Noranda Exploration Limited	Diamond drilling and VLF electromagnetic survey in the Houghton Lake area and VLF-electromagnetic survey in the Trist Lake area.
17	Norcen Exploration Limited	Line cutting, geological survey in the Horseshoe Lake area.
18	Pidgeon Molybdenum Mines Limited	Diamond drilling in Echo Township.
19	Patino Mines Limited	Ground electromagnetic & magnetometer surveys in Webb Township.
20	Preussag Canada Limited	Geological and magnetometer and electromagnetic surveys in the Houghton Lake area.
21	Ramsey, Raymond	Geochemical survey in the Grebe Lake-McCubbin Township area.
22	Ram Petroleum Limited	Ground electromagnetic survey in Poisson Township.
23	Selco Mining Corporation Limited	Diamond drilling in Echo and McIlraith Townships.
24	Stargazer Resources Limited	Claim staking, line cutting prospecting, geological, geochemical, and geophysical (ground and air) surveys in the Armit Lake area, Brenner Township, Conant Township, Grebe Lake-McCubbin Township, Houghton Lake area, Jutten Township, McGillis Township and Poisson Township areas.
25	Sulpetro Minerals Limited (St. Joseph Exploration)	Airborne and Ground magnetometer and electromagnetic surveys, claim staking, line cutting, soil sampling, geological mapping in the Kabik Lake and Pickerel Township, Wesleyan Lake, Echo Township, Drayton Township and Bamaji Lake areas.
26	Tarbush Lode Mining	Diamond drilling in McAree Township.
27	Union Miniere Explorations and Mining Corporation Limited	Diamond drilling, ground geophysics in Beckington Lake and Collishaw Lake areas and diamond drilling in Evans Lake area.
28	Urangesellschaft Canada Ltd.	Diamond drilling, trenching, geology, geochemistry, geophysical surveys in the Fry Lake area.
29	Wilkinson, Don	Geological, geochemical and Induced Polarization surveys in the Echo Township area.

underground copper-nickel deposit. In addition, a new open pit was phased into operation, and will be called the Kapkichi Pit. A new section was added to the mill to allow preparation of a nickel as well as a copper concentrate. The mill continues to operate at approximately 100 000 tons per month.

Mattabi Mines Limited is operating at near design capacity with ore from its own pit and underground workings, supplemented with ore from the Lyon Lake Mine and the "F" group open pit. A shaft has been sunk on the Mattabi property to allow access to the lower levels of the ore body.

One new deposit has been proved up during the year. UMEX has drilled a small tonnage zinc-copper-silver deposit near the intersection of the Marchington Road and Highway 599 in the Evans Lake area (M-1774). Taken together with the Musselwhite Consortium's announcement of a significant gold deposit on Opapimiskan Lake, this has been a good year for the Patricia Mining Division.

Industrial Minerals

Potting Soil

Manufacture of potting soil and related products is continuing at the Du-Nor Products plant in Sioux Lookout. The company expanded production and product variety. Greater effort is being made to promote locally derived products and its success shows that properly targeted retail products can be manufactured in Northwestern Ontario.

Rock Ballast

BACM operated the Watcomb quarry in 1981, producing crushed railway ballast for the Candian National Railway mainline maintenance in Northwestern Ontario.

Sand and Gravel

Approximately 400 000 tons of aggregate were used in road and building construction in 1981. A study of aggregate

potential in the Sioux Lookout area was carried out by Geo-Analysis of Ottawa under contract to the Ontario Ministry of Natural Resources. The study concluded that a shortage of coarse aggregate would occur in the vicinity of Sioux Lookout within a five to ten year period if action were not taken to conserve present resources and develop new supplies. A report (Ringrose and McGillwray 1981) has been published.

Mineral Exploration Activity

Base-metal exploration has declined from the level in 1980 and few new programs have been started; the activity consisted mainly of follow-up and completion of existing programs. Base-metal programs continued in the Houghton-Hough Lakes area and on Sturgeon Lake. Diamond drilling and geophysical follow-up programs were run to the north of Bamaji Lake and in the Meen Lake area. A considerable amount of work took place around the Minnitaki Lake felsic centre and this continued to be an active area because of relatively good access and favourable geology.

Precious metal exploration has compensated for the lower base-metal activity to maintain the 1981 level of activity at or above the 1980 level. Major programs were conducted on Sturgeon, Kashaweogama, and Opapimiskan Lakes during the year and preliminary surveys were done on Minnitaki, Horseshoe, and Fry Lakes. Several new programs are planned for early 1982.

Claim staking and assessment work filed reflect the level of activity in 1981. Claim staking remains at about the 1980 level, as does diamond drilling. The number of active claims is approaching 10 000, a level last seen during the peak of the Sturgeon Lake rush.

There has been a great increase in the filing of geophysical surveys. This reflects the increased grassroots activity and also the greater number of active claims. In fact, the Patricia Mining Division alone recorded in 1981 approximately 40 percent of the 1980 Provincial total for geophysical work days.

The statistics in Table 2 were compiled for the Patricia Mining Division for 1981.

TABLE 2
SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT
PATRICIA MINING DIVISION FROM 1974 to 1981

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1974	1,011	3,223	5,659	38,049.0	6,255	102	44,406
1975	1,019	2,489	3,903	38,492.7	18,953	1,858	59,303.7
1976	1,185	1,120	3,958	27,111.0	11,555	185	38,851
1977	1,261	1,320	3,760	17,880.1	13,931	946	32,757.1
1978	2,018	765	5,094	33,371.3	57,501	600	91,472.3
1979	1,012	1,061	5,045	30,869	27,605.4	1,949	60,423.4
1980	3,485	1,391	7,068	42,633	13,524	10,800	66,957
1981	3,103*	721*	9,450*	37,899.5*	245,283.75*	3,326.5*	286,509

*All 1981 totals are for an 11 month period (January - November)

**TABLE 3 MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA
PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY,
MINISTRY OF NATURAL RESOURCES.**

Ontario Geological Survey Reports

GR 193

Open File Reports

OFR 5332
OFR 5340

Preliminary Maps - Geological Series

2125 2128 2293
2440 2442 2395

Preliminary Maps - Data Series

p. 2125
p. 2128

Aggregate Resources Publications

Federal - Provincial Maps

Coloured Maps

Northern Ontario Engineering Geology Terrain Studies Report

Press Lake Area (NTS 52/G NW), District of
Kenora.

Northern Ontario Engineering Terrain Studies Maps

5062 5066

Mineral Resources Branch Publications

Miscellaneous Reports

Mineral Policy Background Paper No. 12, "Gold",
by Thomas P. Mohide.

Occasional Paper No.7, "Evaluation and Potential
of Peat in Ontario", by Monenco Ontario Limited.

Several development and exploration projects are worthy of special note. Goldlund Mines Limited are in construction of a 200 t.p.d. gold mill which is expected to start up in early 1982. Gallant Gold Mines Limited have conducted exploration studies with a view to re-opening one or more of the gold deposits of Pickle Lake. The Musselwhite Consortium continued the exploration and development of their Opapimiskan Lake properties. Several other major companies have mounted programs in the same belt.

Activity continues in the Big Trout Lake area for ultramafic related mineralization.

Several large claim blocks have been staked on Horseshoe Lake for gold exploration programs.

Properties Visited, Under Evaluation, and/or Exploration

Nahanni Mines Limited (Quyta Property)

An extensive diamond drill and geological mapping program has been completed on this property in Echo Town-

ship. The program has concentrated on two locations, the Quyta occurrence, and the Miller showing. Drill intersections of a sheared zone in felsic extrusive and intrusive rocks gave good intersections with significant gold values.

Pidgeon Molybdenum Mines Limited (RioCanex Limited)

The Lateral Lake molybdenum property of this company has been evaluated by an extensive diamond drill program in 1980 and 1981. The molybdenum mineralization, which is located on the south limb of the Lateral Lake Stock, has indicated tonnages in excess of 15 000 000 tons at 0.08 percent molybdenum. The mineralization is related to late felsic dikes and quartz veins which post-date the Lateral Lake Stock, but are cut by the highly differentiated tantalum-bearing granite dikes of the Gullwing Lake area. The major granitic intrusion in this area, the Ghost Lake Batholith, has apparently been parental to two differing mineral suites. The early syntectonic Lateral Lake Stock is cut by both the molybdenum-bearing quartz veins and dikes and by late, highly differentiated biotite-muscovite pegmatitic granites which were probably parental to the Tot Lake and other tantalum-lithium dikes of the area. Additional work will be required to assess the tantalum potential of this area, but the molybdenum deposit is a proven reserve, on the shelf for a time of improved molybdenum price.

Musselwhite Consortium (Opapimiskan Lake)

The Musselwhite Consortium is operated by Dome Exploration (Canada) Limited, other participants are Inco, Esso Minerals Canada, and Lacana Mining Corporation. The Consortium holds a large claim block on Opapimiskan Lake of the North Caribou Lake Volcanic Belt. The property is a large (1 000 000 ton plus) gold deposit in deformed, metamorphosed iron formation with a minimum grade of 0.2 ounce Au per ton. A more detailed description of the geology is given in A.J. Andrews, *et al.* (1981). During 1981, the Consortium carried out engineering and environmental studies.

Further exploration is planned for 1982 to extend the proven reserves. Large claim blocks have been staked by other companies in the area, and exploration is planned on several of these blocks. Grab samples reported in Andrews *et al.* (1981), show that anomalous gold values are found in chemical sediments in several locations within the belt.

Stargazer Resources Limited

This company holds a large claim block on Kashaweogama and Savant Lakes in the Patricia Mining Division. The company has carried out geophysical and geological mapping programs on this property and has followed up with an extensive humic gold geochemical survey. Several interesting targets were outlined and will be drill tested in early 1982. The humic gold survey was

capable of outlining anomalous horizons, or rock units under soil cover, and was shown to be a cost-effective exploration method in this environment. Several interesting geologic environments with known gold occurrences fall within the claim block so that this program is of considerable interest as a test case as well as a practical exploration program.

Sulpetro Minerals Limited

This company conducted geological, geophysical, and geochemical programs over several claims groups in the Echo Township and Minnitaki Lake area. A number of vein gold occurrences are known from these areas, and the program was designed to find extensions under overburden of these known showings and deposits. In addition, base metals were sought in the Southeast Bay of Minnitaki Lake and in Echo Township.

Gallant Gold Mines Limited

Gallant Gold Mines Limited ran a drill and mapping program over the Pickle Crow and Albany Mines area of Pickle Lake during the summer of 1981.

Gallant Mines Limited are interested in re-opening the Pickle Crow Mine which contains known reserves of gold. Additional ore will be required if this is to be economically viable. Gallant Mines Limited drilled several quartz veins near the Albany shaft, with good values. The company is negotiating to acquire the rights to other known deposits in the area.

Sturgeon Lake Area

This area has had a number of companies working on known and newly discovered gold deposits and occurrences.

A new zone has been established to the north of King Bay with narrow blue quartz veins giving spectacular gold values. This zone, which is expressed as a series of *en echelon* narrow quartz veins trending east-west, is characterized by blue quartz and simple pyrite-chalcopyrite mineralization. Three known occurrences outcrop, the Rickaby, Rainbow Island, and the new Armstrong-Best occurrences. Several of these showings are situated at the contact between the Sturgeon Lake granodiorite and sheared basic metavolcanic flows, and are usually associated with carbonate replacement zones to breccias in the flows. Individual veins appear to dip steeply to the south and vary from 2 to 300 feet in length. Grab samples vary widely in gold content from nil to several ounces per ton. While none of these properties appear to be capable of supporting a mill at present, small mining at a custom mill is possible.

To the north of King Bay, consideration is being given to re-opening the St. Anthony Mine by the present owners.

The Richelieu Mines property is being examined as a possible small mining candidate. A considerable amount of work has been done on this property in the

NORTHWESTERN — SIOUX LOOKOUT

TABLE 4

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

PATRICIA MINING DIVISION

SYMBOLS AND ABBREVIATIONS

Au - gold
 Ag - silver
 Cu - copper
 Fe - iron
 Pb - lead
 Zn - zinc
 s - sulphides
 py - pyrite
 po - pyrrhotite
 mo - molybdenite

sp - sphalerite
 mag - magnetite
 hem - hematite
 gn - galena
 cp - chalcopyrite
 gf - graphite
 c - clay, clayey
 m - silt, silty
 s - sand, sandy
 g - gravel, gravelly

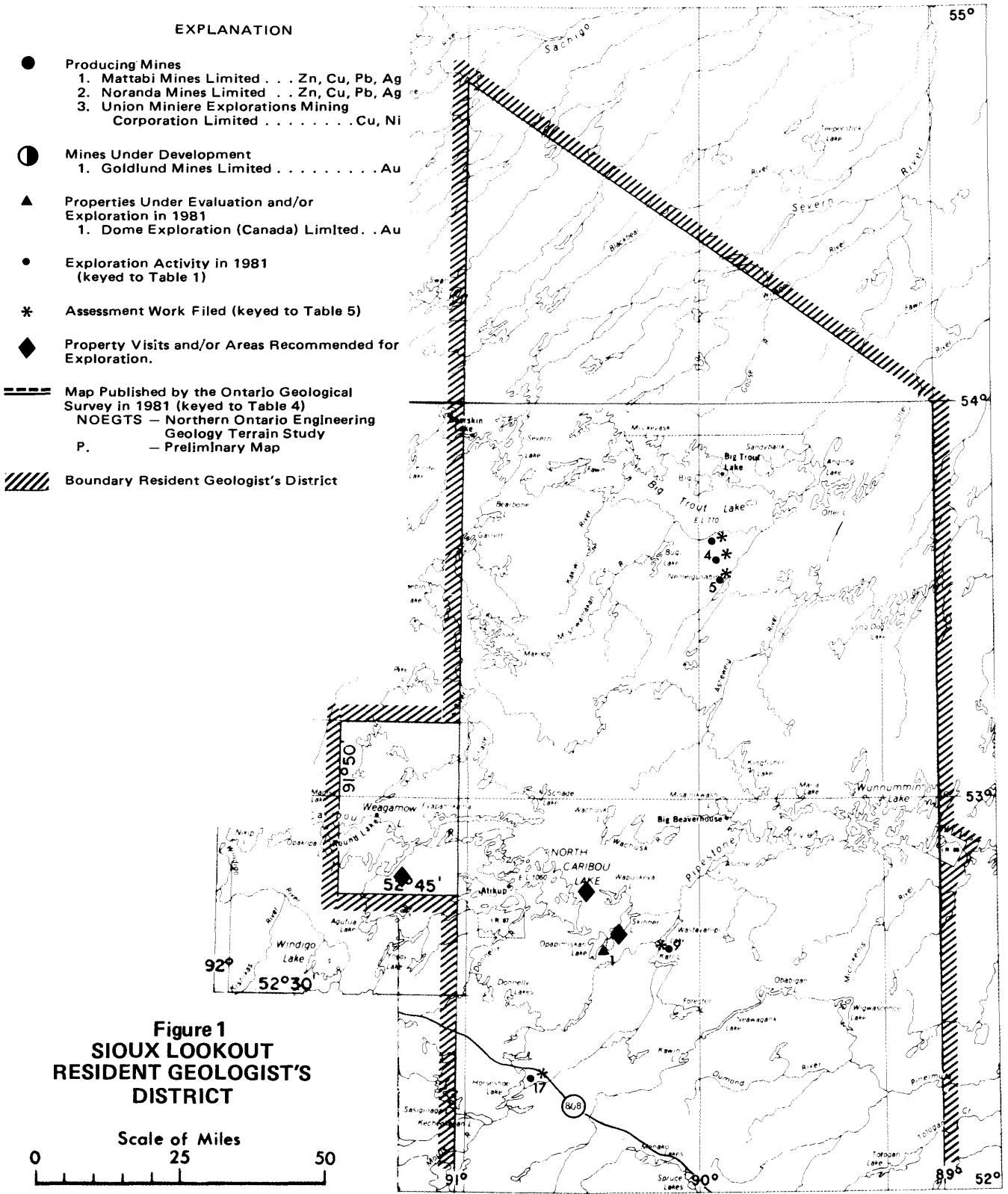
b - boulders, bouldery
 p - peat, muck
 t - till
 rtr - rock trenching
 tr - trace amounts
 DD 10 / 12,640' - diamond
 drilling 10 holes 12,640
 foot total
 Assess - Assessment Data
 Non-Assess - Non-Assessment Data

IP - Induced Polarization Survey
 BS - Beneficiation Studies
 STD 3 / 75 - soils test drilling
 3 holes 75 foot total
 Mag-Ground Magnetometer Survey
 VEM - Vertical Loop Survey
 VLF - Very Low Frequency Survey
 HEM - Horizontal Loop Survey
 Geol - Geological Survey
 AEM - Airborne Electromagnetic Survey
 AM - Airborne Magnetometer Survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Beardy	53 H/12 NW	Canadian Nickel Company Limited		Assess.	DD 3 / 4405'	1981		5
Beckington Lake	52 J/2 NE	Union Miniere Explorations and Mining Corporation Limited		Assess.	1 Geol, Mag	1981		46
Benner Township	52 J/9 SW	Stargazer Resources Limited		Assess.	VLF-EM, Mag	1981	2.3874	36
Collishaw Lake	52 P/12 NW	Union Miniere Explorations and Mining Corporation Limited		Assess.	Mag	1981		20
Conant Township	52 J/7 SE	Stargazer Resources Limited		Assess.	VLF-EM, Mag	1981	2.3874	84
Drayton Township	52 J/4 SW	Denison Mines Limited	Au, Ag	Assess.	Geol, Soil, Geochem, EM-16, Unimag	1981		21
Drum Lake	52 0/3 NE	Cominco Limited		Assess.	DD 1 / 326'	1981		41
Echo Township	52 F/16 NW	Wilkinson, Don		Assess.	Geochem-IP-Geological	1981	2.3611	53
	52 F/16 NW	Selco Incorporated		Assess.	DD 1/ 121'	1981		54
	52 F/16 NW	Pidgeon Molybdenum Mines Limited		Assess.	DD 2 / 769'	1981		55
	52 F/16 NW	Goldlund Mines Limited		Assess.	Soil Sampling	1981		51
	52 F/16 NW	Goldlund Mines Limited		Assess.		1981		56
	52 F/16 NW	Selco Incorporated	Sp,po,py	Assess.	DD / 283'	1981		52
Evans Lake	52 J/7 SE	Union Miniere Explorations and Mining Corporation Limited		Assess.	DD 4 / 2642'	1981		85
	52 J/7 SE	Eric Hadley		Assess.	DD 1 / 104'	1981		86
Fourbay Lake	52 J/2 SW	Corporation Falconbridge Copper		Assess.	Mag, EM	1981	2.3516	55
	52 J/2 SW	Corporation Falconbridge Copper	py, po,cp	Assess.	DD 5 / 2812'	1981		56
	52 J/2 SW	Armstrong, George and Best, Allan		Assess.	DD 1 / 575'	1981		57
	52 J/2 SW	Armstrong, George and Best, Allan		Assess.	Mag	1981		58
Fry Lake	52 0/3 NW	Urangesellschaft Canada Limited		Assess.	DD 2 / 906' Trenching and Assays	1980		29
	52 0/3 NW	Urangesellschaft Canada Limited	Au	Assess.	VLF-EM, Geol Geochem assays, Trenching	1980	2.3259	30
	52 0/3 NW	Urangesellschaft Canada Limited		Assess.	Assay, trenching	1980	2.3688	31
Grebe Lake- McCubbin Township	52 J/7 NE	Ramsey, Raymond G.	Au	Assess.	Geochem report	1981	2.3662	42
	52 J/7 NE	Stargazer Resources Limited		Assess.	EM, VLF-EM, Mag	1981	2.3874	43
Greenbush Lake	52 J/16 NE	Belore Mines Limited	ta	Assess.	Mag	1981	2.3387	5
Houghton Lake	52 J/7 SW	Preussag Canada Limited		Assess.	Geol	1980	2.3504	20
	52 J/7 SW	Preussag Canada Limited		Assess.	Mag and HEM	1980	2.3411	21

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Houghton Lake	52 J/7 SW	Noranda Exploration Company Limited		Assess.	HEM	1981	2.3708	22
	52 J/7 SW	Stargazer Resources Limited		Assess.	Mag, VLF-EM	1981	2.3874	23 (52J/7NE43)
Jutten Township	52 J/8 NW	Stargazer Resources		Assess.	Mag, VLF-EM	1981	2.3874	29 (52J/7NE43)
Kabik Lake and Pickerel Township	52 F/16 NE	Nahanni Mines Limited	py, Au	Assess.	Geol	1980	2.3506	37
	52 F/16 NE	Braeswood Exploration Limited		Assess.	Mag, EM	1981		38
	52 F/16 NE	Nahanni Mines Limited		Assess.	DD 10/ 6337'	1980		39
	52 F/16 NE	Sulpetro Minerals Limited		Assess.	HEM, Mag	1981	2.3915	40
	52 F/16 NE	Cominco Limited	Au	Assess.		1981	2.3756	44
Kawashe Lake	52 0/6 SE	Cominco Limited		Assess.	DD 3 / 934'	1981		20
McAree Township	52 F/16 SW	Tarbush Lode Mining		Assess.	DD 3 / 1393'	1980		30
McGillis Township	52 J/8 NW	Stargazer Resources Limited		Assess.	VLF-EM, Mag	1981	2.3874	29 (52J/7NE43)
McIlraith Township	52 F/16 NW	Selco Incorporated		Assess.	DD 1 / 283'	1979		52
Meen Lake	52 0/6 NW	Cominco Limited	Fe	Assess.	Mag	1980	2.3438	9
	52 0/6 NW	Cominco Limited		Assess.	DD 1 / 336'	1981		10
	52 0/6 NW	Cominco Limited		Assess.	DD 4 / 1322'	1981		11
Poisson Township	52 J/7 NE	Ram Petroleum Limited (R. Ramsay)		Assess.	VLF-EM	1980	2.3373	41
	52 J/7 NE	Stargazer Resources		Assess.	VLF-EM, Mag	1981	2.2874	29 (52J/7NE43)
Quest Lake	52 G/15 NE	Corporation Falconbridge Copper	py,po,cp	Assess.	DD 5 / 2395'	1980		26
Savant Lake	52 J/9 SW	Stargazer Resources Limited		Assess.	Mag, EM-VLF	1981	2.3874	36 (52J/7NE43)
Sixmile Lake	52 G/15 NW	Mattagami Lake Mines Limited		Assess.	VLF-EM	1980	2.3368	114
	52 G/15 NW	Mattagami Lake Mines Limited		Assess.	DD 8 / 3625'	1981		113
Trist Lake	52 J/14 NE	Noranda Exploration Company Limited		Assess.	VEM	1980	2.3297	12
Webb Township	52 F/15 NE	Patino Mines (Quebec) Limited	Base Metals	Assess.	Mag and EM	1980	2.3604	22
Wesleyan Lake	52 0/4 NE	St. Joseph Exploration		Assess.	Mag,VLF-EM,HEM	1981		13
Nemeigusabins Lake	53 H/12 SW	Canadian Nickel Company Limited		Assess.	DD 3 / 4581'	1980		11
	52 H/12 SW	Canadian Occidental Petroleum		Assess.	DD 3 / 684'	1981		12
Zeemel Lake	53 B/9 SE	Dome Exploration (Canada) Limited	py,po,cp	Assess.	DD 11 / 5742'	1980		16
	53 B/9 SE	Dome Exploration (Canada) Limited		Assess.	DD 1 / 602.0'	1981		17



Adjoins Figure 1

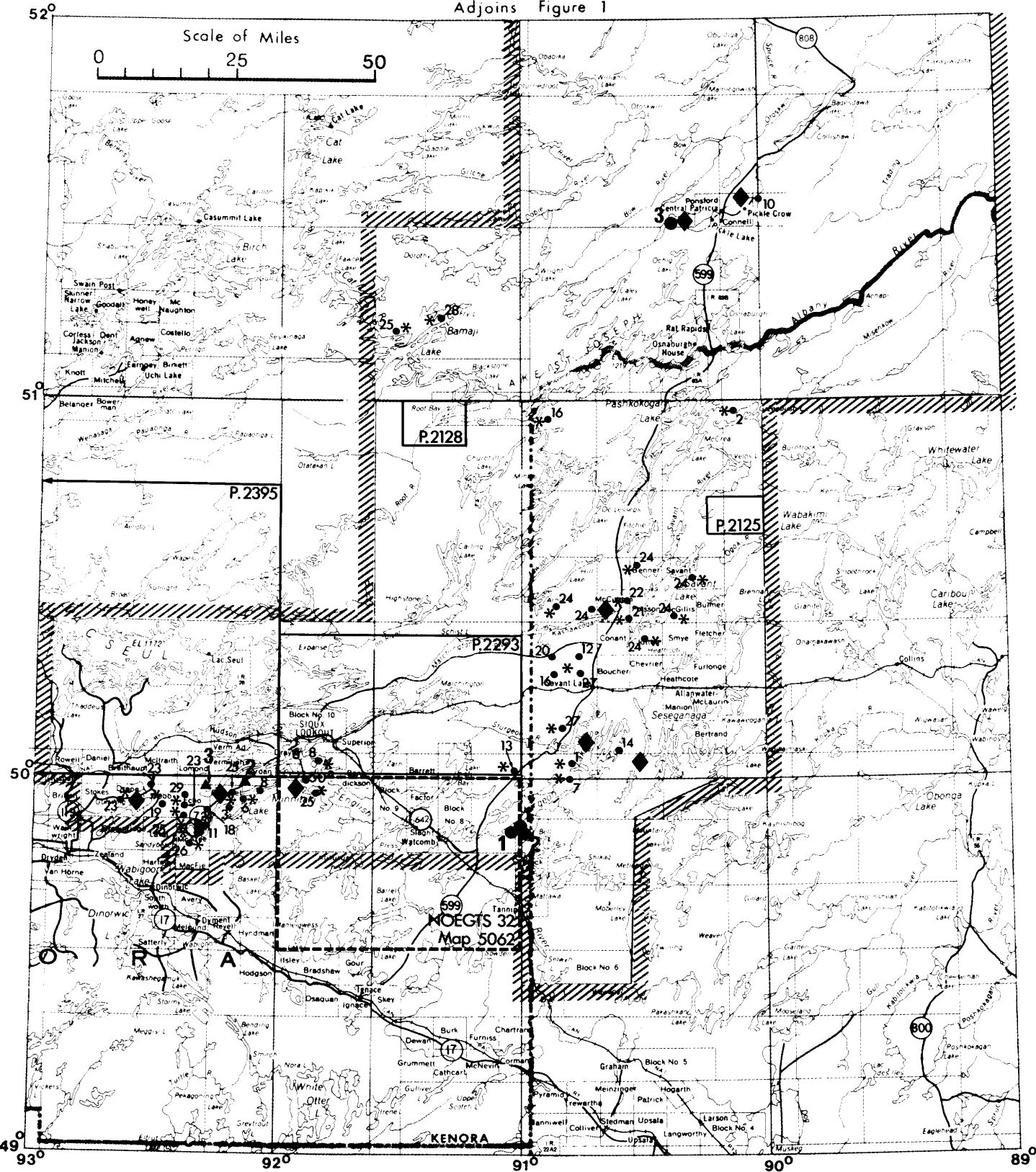


Figure 2

past and the main vein, while narrow, has considerable strike length. Spectacular free gold samples have been taken from this simple quartz-chalcopyrite-pyrite-tourmaline vein. A grab sample collected by the Sioux Lookout Resident Geologist and containing much chalcopyrite and tourmaline assayed 2.99 ounces per ton Au. The average tenor would be considerably less than this. Several other properties held by Sherritt-Gordon Mines Limited on the Northeast Arm have given good gold values, and small mining all or several of these properties is a good possibility. Most deposits are located at granite/greenstone contacts, or at the contacts of sheared competent bodies.

Tarbush Lode Mining Limited

This company has a large claim block along the extension of the Goldlund Windfall zone in Echo Township. Geological mapping has been done to identify the several dikes and felsic intrusions which run through the area. Alteration zones have been found in several of the bodies but overburden has hindered mapping the continuation of these units. A number of small gold showings are known from drill holes, but the significance of these, if any, is impossible to assess until the various units can be mapped throughout the area. A drill program is planned to test the geologic model.

Recommendations for Exploration

Mavis Lake-Gullwing Lake Area

The senior author has previously discussed (Janes and Speed 1980) the very favourable environment for lithophile mineralization in this area. In 1981, several finds of tantalum-bearing granitic dikes throughout this area suggest that this segment of the Ghost Lake Batholith is a prime target for tantalum and lithium exploration. Little detailed geological information is known about the Ghost Lake Batholith and a combined geologic-geochemical approach is advised. In general, the contacts of the English River Gneissic Belt with the Wabigoon and Uchi Volcanic Belts are favourable areas for lithophile mineralization.

North Caribou Lake Belt

This area has had considerable attention for iron formation related gold mineralization. In general, this area has little exposure and a combined geophysical, geological, and surficial mapping approach is recommended. The North Caribou Lake Belt, in common with other belts in this region, is roughly transverse to the glacial direction. Sampling of large boulder trains is recommended as a rapid assessment method. Since several of the known deposits are associated with contorted iron formation, as detailed as possible a magnetic survey using the vertical gradient method would appear to offer the best chance to find suitable targets under overburden.

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1980: Geology, and Electrical, and Electromagnetic Modelling of Volcanogenic Sulphide Bodies Near Savant Lake, Ontario; Thesis submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, August, 1980, The Pennsylvania State University, The Graduate School Department of Geosciences.
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1977: Geophysics and Geochemistry in the Search for Metallic Ores; Geological Survey of Canada, Economic Geology, Report 31, 811p.

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1981: 1980 Report of the Sioux Lookout Resident Geologist; p.30-42 *in* Annual Report of the Regional and Resident Geologists, 1980, Edited by C. R. Kustra, Ontario Geological Survey, Miscellaneous Paper 95, 158p.
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1981: No. 6, Parnes Lake Area, District of Kenora; p.26-27 *in* Summary of Field Work, 1980, by the Ontario Geological Survey, Edited by V. G. Milne, O. L. White, R. B. Barlow, J. A. Robertson, and A. C. Colvine, Miscellaneous Paper 96. 201p.

1981 Report of the Thunder Bay Resident Geologist

W. H. McIlwaine¹, K. G. Fenwick², J. F. Scott³, J. K. Mason³, B. R. Schnieders³, F. J. Kristiansson⁴, A. A. Speed³, and H. M. Bourdages³

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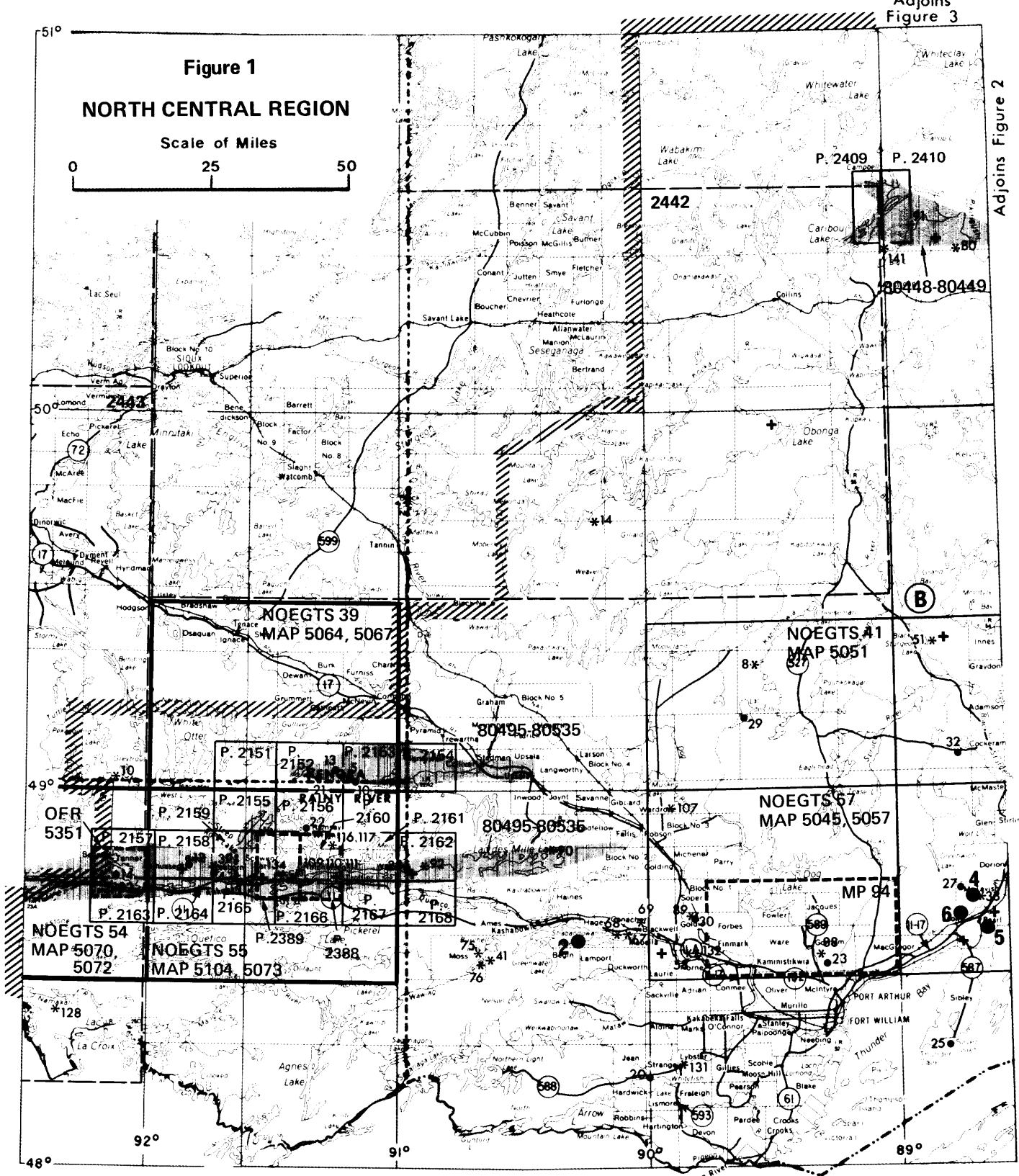
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³Resource Geologist, Ontario Ministry of Natural Resources, Thunder Bay.

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Figure 1
NORTH CENTRAL REGION

Scale of Miles



EXPLANATION

- Map issued by the Ontario Geological Survey in 1981 (keyed to Table 4)
- P - Preliminary map.
- OFR - Open File Report
- MP - Miscellaneous Paper
- 2443 - Coloured Geological Map
- 5073 - Coloured NOEGTS Map
- 80448 - Federal - Provincial Maps (Geophysical/Geochemical Series Airborne Electro Magnetic Survey)

- Boundary of North Central Region
- Exploration activity in 1981 (keyed to Table 2)
- * Assessment work filed in 1981 (keyed to Table 1)
- + Major claim staking in 1981
- (B)** Location of OGS field party in 1981

Adjoins Figure 1

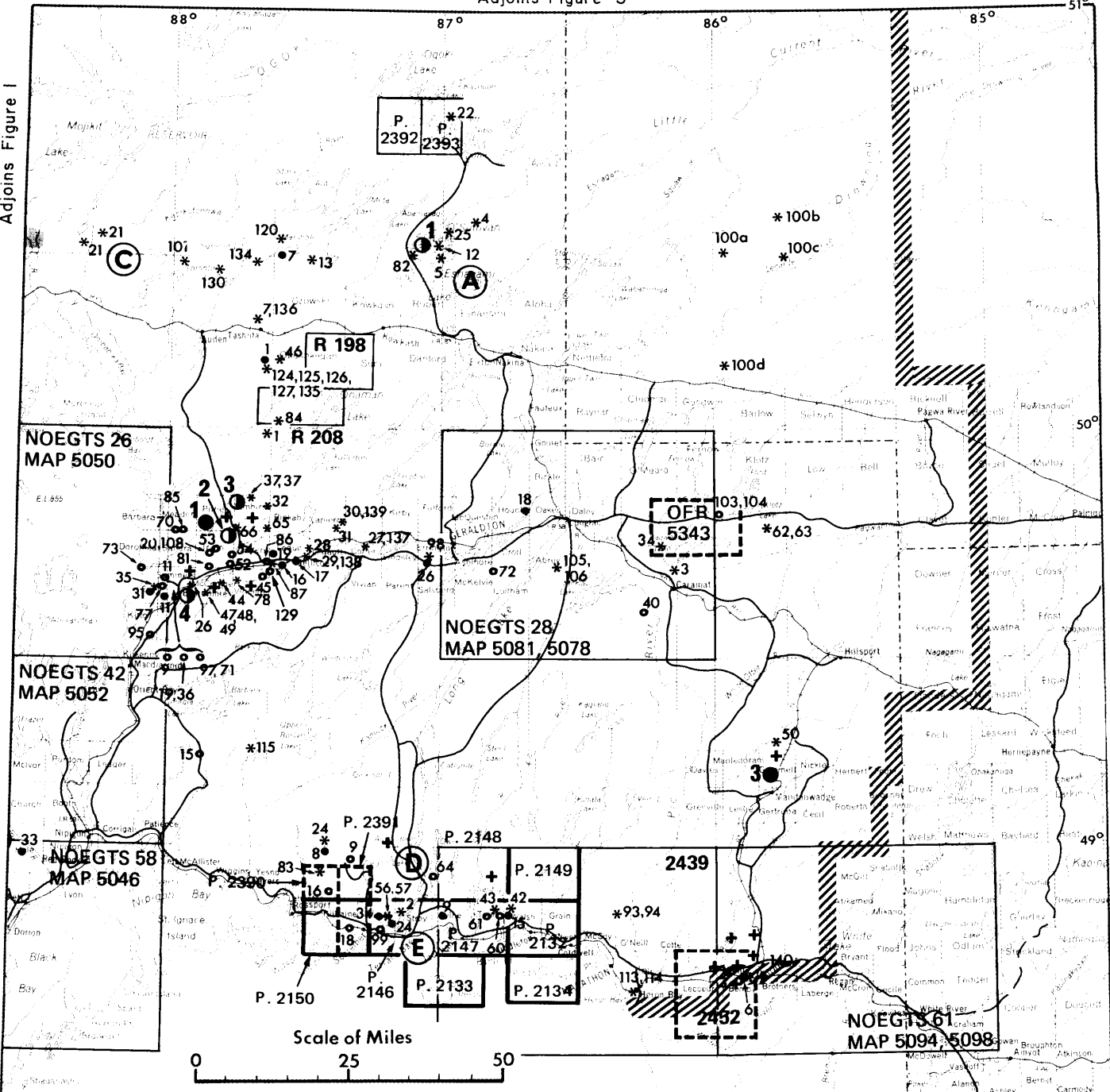


Figure 2

EXPLANATION

- **Producing Mines**
 1. Algoma Development Company Au, Cu
 2. Inco Metals Ltd. Shebandowan Mine Cu, Ni, Pt, Co
 3. Noranda Mines Ltd. Geco Division Cu, Zn, Ag
 4. Gunnard Noyes - Diamond Willow Mine Amethyst
 5. Ontario Gem Company Amethyst
 6. Precious Purple Gems Ltd. Amethyst

- **Mines and/or Properties Under Development**
 1. Consolidated Louanna Gold Mines Ltd. Au
 2. Goldwater Mines - Brenbar Mines Ltd. Au
 3. Greenoaks Prospect Au
 4. Pan Empire Joint Feature Au

- **Noranda Files**
23, 59, 74 (not shown on map)
- Preliminary Maps**
P. 2417, P. 2418 (not shown on map)

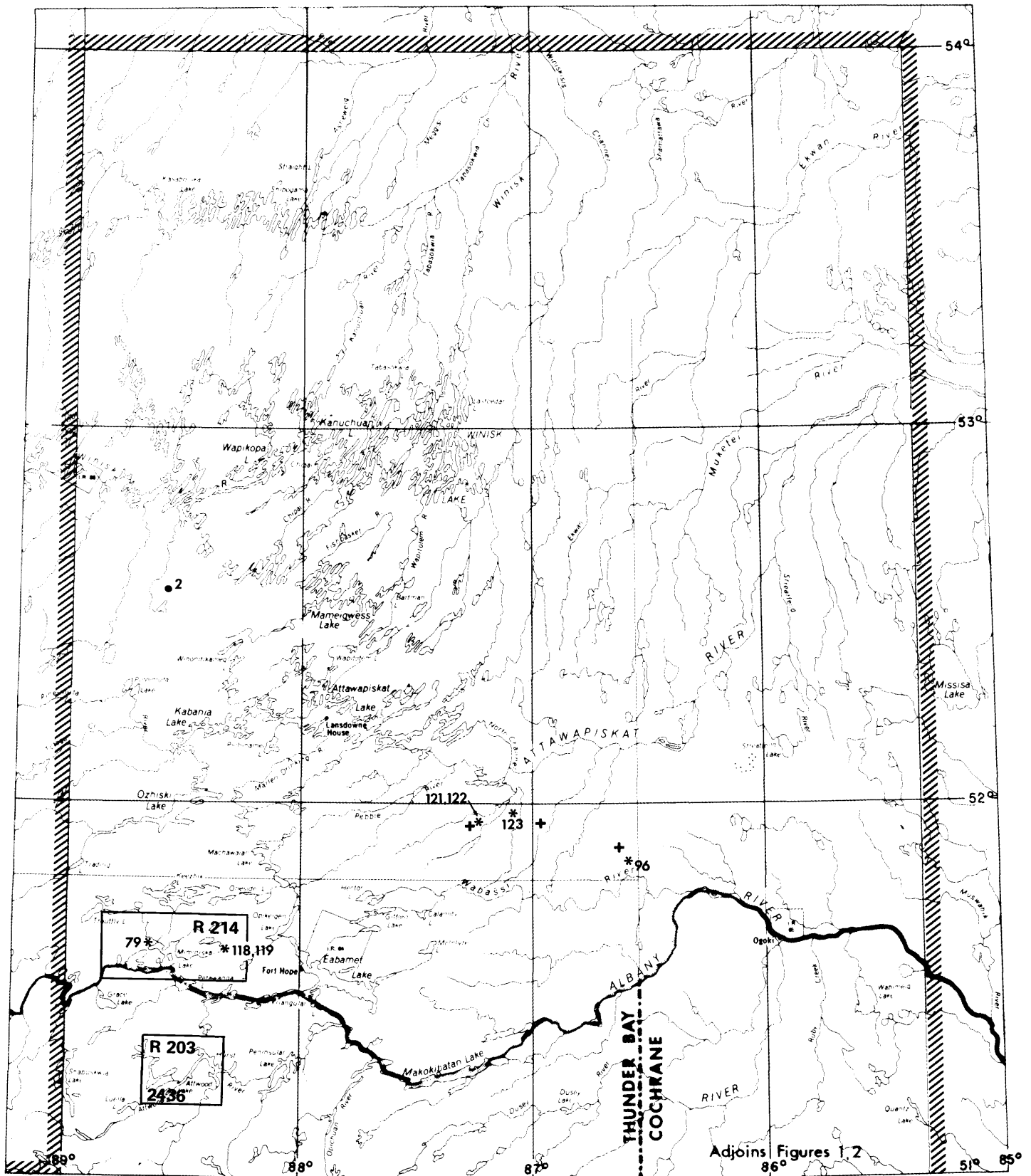
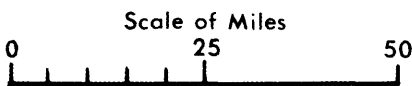




Figure 3

NORTH CENTRAL REGION



EXPLANATION

- | | | | |
|---|--|---|--|
|  | Map issued by the Ontario Geological Survey in 1981 (keyed to Table 4) |  | Boundary of North Central Region |
| P | - Preliminary map. | ● | Exploration activity in 1981 (keyed to Table 2) |
| OFR | - Open File Report | * | Assessment work filed in 1981 (keyed to Table 1) |
| R | - OGS Report | + | Major claim staking in 1981 |
| 2443 | - Coloured Geological Map | ○ | Noranda Files |
| 5073 | - Coloured NOEGTS Map | Ⓐ | Location of OGS field party in 1981 |

NORTH CENTRAL — THUNDER BAY

TABLE 1

Assay-Assay Results
 AEM-Airborne Electromagnetic Survey
 A Mag-Airborne Magnetometer Survey
 Assess-Assessment Work
 Non Assess-Non Assessment Work Data
 BM-Base Metal
 BS-Beneficiation Studies
 DD-Diamond Drilling (where shown, the numbers following "DD" indicate the number of holes drilled and the total length drilled respectively).
 EM-Electromagnetic Survey
 G-Ground Survey
 Geochem-Geochemical Survey

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

GL-Geological Survey
 IP-Induced Polarization Survey
 MEAP-Mineral Exploration Assistance Program
 Mag-Magnetometer Survey
 Rad-Radiometric Survey
 Tr-Trenching
 VLF-Very Low Frequency
 pet-petrographic studies

Au-Gold
 Ag-Silver
 Cu-Copper
 Fe-Iron
 Li-Lithium
 Mo-Molybdenum
 Ta-Tantalum
 Zn-Zinc
 Pt-Platinum
 Pd-Palladium
 Ni-Nickel

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Castlewood Lake Area (G22)	42E13/NE	1. Abitibi-Price, Inc.	Bm, Au	Assess	Mag., EM	1981	-	-
Strey Township (M1931)	42D4/SE	2. Walter Acker	Au	Assess	DD 2 - 182.9m	1981	-	-
Pagwachuan Lake Area (G368)	42E9/NE	3. Algoma Steel Corporation Ltd. (Peterson Claims)	Fe	Non-Assess	GL	1965	-	-
Muriel River Area (G336)	42L10/SW	4. Amax Exploration Inc.	Bm, Au, Ag	Assess	A. Mag.	1980	-	-
O'Sullivan Lake Area (G362)	42L7/NW	5. Amax Exploration Inc.	Bm, Au, Ag	Assess	Mag., EM	1981	-	-
Willet Lake Area (G156)	42L5/SE	7. Amax Exploration Inc.	Au	Assess	DD 2 - 156 m	1981	-	-
Metcalfe Lake Area (G84)	42L4/NE	136. Amax Exploration Inc.	Bm, Au	Assess	DD 20-2076.3 m	1981	-	-
Heaven Lake Area (M2908)	52H5/SE	8. Amoco Canada Petroleum Co. Ltd.	Bm	Assess	DD 1 - 102.7m	1981	-	-
Priske Township (M1932)	42D14/SE	9. L. C. Anderson (Ciglen Group)	Cu, Zn	Non-Assess	GL	1951	-	-
Greytrout Lake Area (M2386)	52F1/SE	10. George Armstrong	Au	Assess	DD 1 - 96.6 m	1981	-	-
Mary Jane Lake Area (G80)	52H9/NE	11. Arnott-Jensen-Cross	Ag	Non-Assess	GL	1961	-	-
Dawson Road Lots (M1692)	52A12/SE	132. Bandolac Mining Co. Ltd.	Au	Assess	GL	1980	-	-
O'Sullivan Lake Area (G362)	42L6/NW	12. E. W. Bazinet	Au	Assess	GL, DD 4 - 161.5 m	1981	-	-
Summit Lake Area (G136)	42L5/NE	13. W. D. Beaton (Bagdad Exploration Partnership)	Bm	Assess	Geochem.	1980	-	-
Empire Lake Area (M2312)	52G9/NE	14. Beth-Canada Mining Co.	-	Assess	Mag.	1980	-	-
Cosgrave Lake Area (G25)	42E4/NW	15. Big Nells Mines Ltd.	Cu	Non-Assess	GL	1966	-	-
Killrairie Township (M1933)	42D14/SW	16. Bohm-Dunning	Ag, Au, Cu	Non-Assess	GL	1952	-	-
Summers Township (G165)	42E12/NW/SW	17. Canadian Beardmore Property	Au	Non-Assess	GL	1936	-	-
Clist Lake Area (G24)	42E12/NE	129. Canadian Nickel Co. Ltd.	Au	Assess	DD 2 - 91.4 m	1972	-	-
Priske Township (M1932)	42D14/SE	18. Candela Development Co.	Bm	Non-Assess	GL	1952	-	-
Summers Township (G165)	42E12/SW	19. Central Beardmore Gold Syndicate	Au	Non-Assess	Prospectus	1934(?)	-	-
Irwin Township (G164)	42E12/NW	20. Coleman Knox L.	Au	Non-Assess	GL	1941	-	-
Crescent Lake Area (G27)	52I8/NW	21. Cominco Ltd.	Li	Assess	GL, Geochem., Mag.	1980	-	-
Ogoki Lake (G357)	42L10/NW	22. Cominco Ltd.	Cu, Zn	Assess	DD 6 - 843 m	1980	-	-
McComber Township (G166)	42E12/SW	23. Copper Prince Mines Ltd.	Au, Ag	Non-Assess	GL, assays	1958	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Molson Lake Area (M33)	42C12/NW	140. Corona Resources Ltd.	Au	Assess	Mag., EM	1980	-	-
Pays Plat Lake Area (M2522)	42H14/NW	24. Corporation Falconbridge Copper	Bm, Au, Mo	Assess	Geophys., GL, Geochem.	1980	-	-
Metcalfe Lake Area (G84)	42L4/NE	134. Corporation Falconbridge Copper	Bm	Assess	GL	1981	-	-
O'Sullivan Lake Area (G362)	42L6/NE	25. G. H. Coyne	Au	Assess	Mag., EM	1980	-	-
Summers Township (G165)	42E12/SW	26. E. R. Davis	Au	MEAP	Geochem.	1980	-	-
Colter Township (M1697)	42E11/NW	27. Dome Exploration (Canada) Ltd.	Au	Assess	Mag., EM	1980	-	-
Leduc Township (G169)	42E12/NE	28. Dome Exploration (Canada) Ltd.	Au	Assess	Mag., EM	1980	-	-
Leduc (G169) and Legault (G170) Townships	42E12/NE 42E11/NW	29. Dome Exploration (Canada) Ltd.	Au	Assess	Mag., EM	1980	-	-
Lapierre Township (G65)	42E14/SW	30. Dome Exploration (Canada) Ltd.	Au	Assess	Mag., EM	1981	-	-
Lapierre Township (G65)	42E14/SW	31. Dome Exploration (Canada) Ltd.	Au	Assess	Mag., EM	1981	-	-
Elmhirst Township (G162)	42E13/SE	32. Dome Exploration (Canada) Ltd.	Au	Assess	DD 5 - 1527.6m	1981	-	-
Colter Township (M1697)	42E11/NW	137. Dome Exploration (Canada) Ltd.	Au	Assess	DD 4 - 499 m	1981	-	-
Leduc Township (G169) and Legault Township (G170)	42E12/NE 42E11/NW	138. Dome Exploration (Canada) Ltd.	Au	Assess	DD 5 - 366.4 m	1981	-	-
Lapierre Township (G65)	42E14/SW	139. Dome Exploration (Canada) Ltd.	Au	Assess	DD 3 - 220.1 m	1981	-	-
McTavish Township (M1812)	52A10/NE	33. Arthur Dungey	-	Assess	DD 2 - 96.3 m	1981	-	-
Pagwachuan Lake Area (G368)	42E9/SE	34. B. H. Durst	-	Assess	GL, Rad.	1980	-	-
Mary Jane Lake Area (G80)	52H9/SE	35. Elcamber Resources Ltd.	Au	MEAP	GL, DD	1935 & 1980	-	-
Summers Township (G165)	42E12/NW/SE	36. Empire Contact Gold Syndicate	Au	Non-Assess	GL	1935	-	-
Kaby Lake Area (G59)	42E13/SE	37. Falconbridge Nickel Mines Ltd.	Mo	Assess	IP	1980	-	-
Kaby Lake Area (G59)	42E13/SE	38. Falconbridge Nickel Mines Ltd.	Mo	Assess	DD 2 - 363 m	1981	-	-
Freeborn Township (M2361)	52B13/NE	39. Fern Elizabeth	Au	Assess	DD 2 - 94.8 m	1980	-	-
Pagwachuan Lake Area (G368)	42E9/SE	40. J. P. Gosselin	Cu, Ni	Non-Assess	GL	1965	-	-
Burchell Lake Area (M2446)	52B10/SE	41. Gulf Minerals of Canada Limited	Cu, Zn, Au	Assess	DD 2 - 493.2 m	1980	-	-
Walsh Township (M1928)	42D15/SE	42. Gulf Minerals of Canada Limited	Au, Bm	Assess	DD 1 - 130 m	1981	-	-
Tuuri Township (M1929)	42D15/SW	43. Gulf Minerals of Canada Limited	Au, Bm	Assess	DD 3 - 357m	1981	-	-
McComber Township (G166)	42E12/SW	44. E. F. Harrington	Au	Assess	Mag	1981	-	-
Vincent Township (G163)	42E12/NW	45. Hilo Gold Syndicate Group	Au	Non-Assess	GL	1938	-	-

NORTH CENTRAL — THUNDER BAY

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Oboshkegan Township (G173)	42L4/NE	46. Hollinger Argus Limited	Au, Bm	Assess	EM, Mag.	1980	-	-
McComber Township (G166)	42E12/SW	47. Albert Hopkins	Au	Assess	DD 2 - 177 m	1981	-	-
McComber Township (G166)	42E12/SW	48. Albert Hopkins	Au	Assess	DD 1 - 92 m	1980	-	-
McComber Township (G166)	42E12/SW	49. Albert Hopkins	Au	Assess	DD 1 - 87.8 m	1980	-	-
Olie Lake Area (M2298)	42F5/SE	50. Hudson Bay Exploration and Development Co. Ltd.	Bm	Assess	EM	1980	-	-
Mikinak Lake Area (G87)	52H7/SW	51. Hudson Bay Exploration and Development Co. Ltd.	Bm	Assess	EM	1981	-	-
Irwin Township (G164) and Sandra Township (G167)	42E12/NW	52. International Mining and Development Co.	Fe	Non-Assess	GL	1917	-	-
Irwin Township (G164)	42E12/NW	53. K. L. Explorations Syndicate	Au	Non-Assess	Assay Plans	1936	-	-
Irwin Township (G164)	42E12/NW	54. Lake Bearskin Mining Syndicate	Au	Non-Assess	GL	1944	-	-
Summers Township (G165)	42E12/NW	55. Longlac Superior Syndicate	Au	Non-Assess	GL	1936	-	-
Priske Township (M1932)	42D14/SE	56. Lormac Explorations Ltd.	Au, Mo	Assess	DD	1981	-	-
Priske Township (M1932)	42D14/SE	57. Lormac Explorations Ltd.	Au, Mo	Assess	GL	1980	-	-
Dawson Road Lots (M1692)	52A12/SE	58. Lynx-Canada Explorations Ltd.	Au	Assess	DD 5 - 417 m	1981	-	-
Summers Township (G165)	42E12/NW	59. McWilliams Beardmore Gold Mining	Au	Non-Assess	GL	1939	-	-
Walsh Township (M1928)	42D9/NW	60. Marlhill Mines Ltd.	Cu, Zn	Non-Assess	GL, assays	1954	-	-
Tuuri Township (M1929)	42D16/SW	61. Marlhill Mines Ltd. (Goodwin Group)	Cu, Zn	Non-Assess	GL	1955	-	-
Klotz Lake Area (G295)	42F13/SW	62. Paul Martin	Au	Assess	DD 3 - 153.9 m	1980	-	-
Klotz Lake Area (G295)	42F13/SW	63. Paul Martin	Au	Assess	Assays, pet	1980	-	-
Lower Aguasabon Lake Area (M2518)	42D14/NE	64. Martin-Hunt Mining Ltd.	Mo	Non-Assess	GL	1966	-	-
Kaby Lake Area (G59)	42E13/SE	65. E. Maraska and A. Mitto	Au	Assess	EM, Mag., DD	1981	-	-
Elmhirst Township (G162)	42E13/SE	66. Mattagami Lake Exploration Ltd.	Au	Assess	GL, Geochem., VLF	1980	-	-
Conacher Township (M1681)	52B9/SE	67. Mattagami Lake Exploration Ltd.	Au	Assess	IP	1980	-	-
Conacher Township (M1681)	52B9/SE	68. Mattagami Lake Exploration Ltd.	Au	Assess	Mag., EM, IP	1981	-	-
Conacher Township (M1681)	52B9/SE	69. Mattagami Lake Exploration Ltd.	Au	Assess	Mag., EM, IP	1981	-	-
Sandra Township (G167) and Meader Township (G168)	42E12/NW	70. The Mining Corporation of Canada (Holm Wodian Prospect)	Au, Ag, Cu	Non-Assess	GL	1963	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Summers Township (G165)	42E12/NW /SW	71. The Mining Corporation of Canada (Cryderman Claims)	Au	Non-Assess	GL	1929	-	-
Croll Township (M1687) and Ashmore Township (G472)	42E10/NW 42E11/NE	72. The Mining Corporation of Canada	Au	Non-Assess	GL	1936	-	-
Mary Jane Lake Area (G80)	52H9/NE	73. Montmorr Gold Mines Ltd.	Au	Non-Assess	GL	1937	-	-
McComber Township (G166)	42E12/NW	74. Morrison-Del-bridge Property	Au	Non-Assess	GL	1948	-	-
Moss Township (M1826)	52B10/SE /SW	75. Mountainview Explorations	Au	Assess	EM, GL	1979	-	-
Moss Township (M1826)	52B10/SE /SW	76. Mountainview Explorations	Au	Assess	DD 1 -13m, GL, EM	1979	-	-
Mary Jane Lake Area (G80) and Summers Township (G165)	52H9/NE	77. Murphy Claims	Au	Non-Assess	GL, assays	1937	-	-
Vincent Township (G163)	42E12/SE	78. B. I. Nelson	Au	Assess	VLF	1980	-	-
Nesting Lake Area (G342)	52P10/SE	79. New Jersey Zinc Exploration Co. (Canada) Ltd.	Bm	Assess	A.EM., A.Mag.	1981	-	-
Linklater Lake Area (G69)	52I10/SW	80. New Jersey Zinc Exploration Co. (Canada) Ltd.	Bm	Assess	A.EM., A.Mag.	1981	-	-
Linklater Lake Area (G69)	52I10/SW	141. New Jersey Zinc Exploration Co. (Canada) Ltd. (Forbes Option)	Bm	Assess	DD 6 - 171.7 m	1981	-	-
Irwin Township (G164) and Walters Township (G171)	42E11/NW 42E12/NE /NW	81. Nipilac Gold-fields Ltd.	Au	Non-Assess	GL	1937	-	-
O'Sullivan Lake Area (G362)	42L7/NW	82. Noranda Explorations Co. Ltd.	Au	Assess	GL	1980	-	-
Rope Lake Area (M2525)	42E3/SW	83. Noranda Explorations Co. Ltd.	Bm	Assess	Mag., EM	1980	-	-
Castlewood Lake Area (G22)	42E13/NE	84. Noranda Explorations Co. Ltd.	Ag, Cu, Zn	Non-Assess	DD 5 - 452 m	1972	-	-
Sandra Township (G167) and Meader Township (G168)	42E12/NW	85. Noranda Mines Ltd. (Kenty Option)	Au	Non-Assess	Summary Report, assays	1947	-	-
Leduc Township (G169)	42E12/NE	86. Oremond Gold Mines Ltd.	Au	Non-Assess	GL	1936	-	-
Legault Township (G170) and Colter Township (M1679)	42E12/NE	87. Oro Plata Mining Corp. Ltd.	Au	Non-Assess	GL	1937	-	-
McComber Township (G166)	42E12/SW	133. Pan Continental Mining (Canada) Ltd.	Au	Assess	A.EM., A.Mag.	1981	-	-
Seeley Lake Area (M1861)	42D16/SW	93. Placer Development Limited	Cu, Po, Pt	Assess	DD 4 - 1061.3 m	1980	-	-
Seeley Lake Area (M1861)	42D16/SW	94. Placer Development Limited	Cu, Po, Pt	Assess	GL, Geochem.	1980	-	-
McCaul Township (M2382)	52B14/SW	134. Placer Development Limited	Au, Bm	Assess	EM., Mag.	1981	-	-
Gorham Township (M1733)	52A11/SW /SE	88. J. W. Redden	-	Assess	Mag.	1980	-	-
Lybster Township (M1800)	52A4/NW	131. J. W. Redden	Ag	Assess	Geochem.	1981	-	-
Goldie Township (M1730)	52A12/NE	89. W. Peterson, T. Peterson, P. Skalesky	Feldspar	Assess	Geophys., GL, Benef. Studies	1981	-	-

NORTH CENTRAL — THUNDER BAY

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Henderson Lake Area (M2399)	42F14/NW	90. Rio Tinto Canadian Exploration Ltd.	Bm	Assess	DD 4 - 645.9 m	1981	-	-
Caribou Lake Area (G19)	52I6/NE	91. Rio Tinto Canadian Exploration Ltd.	Bm	Assess	A.Mag.	1980	-	-
Bedivere Lake Area (M1647)	52B15/SW /SE	92. Rio Canex, Inc.	Bm	Assess	DD 17 - 1709.2 m	1981	-	-
Mary Jane Lake Area (G80)	52H9/SE	95. B. Pressman	Au	Non-Assess	GL, assays	1961	-	-
Oxtoby Lake Area (G365)	42M16/NW	96. Prospection Ltd.	Bm	Assess	A.Mag., A.EM	1980	-	-
Summers Township (G165)	42E12/NW /SW	97. Richgreen Gold Mine Ltd.	Au	Non-Assess	GL	1937	-	-
Errington Township (G479)	42E11/NE	98. Roxmark Mines	Au	Assess	GL, Prospectus	1981	-	-
Priske Township (M1932)	42D14/SE	99. W. Samuel	Fe	Non-Assess	GL	1958	-	-
McCulley Lake Area (G323)	42K5/NW	100a. Selco, Inc.	-	Assess	Mag.	1981	-	-
Michel Lake Area (G329)	42K12/SW	100b. Selco, Inc.	-	Assess	Mag.	1981	-	-
Michel Creek Area (G328)	42K5/NE	100c. Selco, Inc.	-	Assess	Mag.	1981	-	-
Atikasibi River Area (G195)	42K4/NW	100d. Selco, Inc.	-	Assess	Mag.	1981	-	-
Junior Lake Area (G57)	42L5/NW	101. Selco, Inc.	Bm	Assess	Mag., EM	1980	-	-
Factor Lake Area (M2389)	52C9/NE	102. Shell Canada Resources Ltd.	Au, Bm	Assess	Mag.	1980	-	-
Castlebar Lake Area (G220)	42E16/SE	103. Shell Canada Resources Ltd.	Au	Assess	DD 2 - 178.3 m	1980	-	-
Klotz Lake Area (G295)	42F13/SW	104. Shell Canada Resources Ltd.	Au, Bm	Assess	DD 1 - 90.5 m	1980	-	-
McBean Lake Area (G321)	42E10/NW	105. Shell Canada Resources Ltd.	-	Assess	DD 9 - 1018 m	1980	-	-
Laponen Lake Area (G300)	42E9/NW	106. Shell Canada Resources Ltd.	-	Assess	DD 1 - 57 m	1980	-	-
Orbit Lake Area (M1731)	52A13/NW	107. Sherritt Gordon Mines Ltd.	-	Assess	Mag., EM	1980	-	-
Irwin Township (G164)	42E12/NE	108. Springer Sturgeon Gold Mines Ltd.	Au	Non-Assess	GL	1934	-	-
McCaul Township (M2382)	52B14/SW	109. Bruce Staines	Au, Bm	MEAP	DD 3 - 200.3 m	1980	-	-
Hutchinson Township (M1823)	52B14/SW	110. Bruce Staines	Au, Bm	Assess	GL, Mag., EM, DD	1980	-	-
McCaul Township (M2382)	52B14/SW	111. Bruce Staines	Au, Bm	Assess	Pet., DD	1980	-	-
Schwenger Township (M2364)	52B13/SE	112. Steep Rock Iron Mines Limited	Au, Bm	Assess	Mag., EM	1980	-	-
Pic Township (M1860)	42D9/NW	113. Victor Stenlund	Au	Assess	DD 1 - 128 m	1981	-	-
Pic Township (M1860)	42D9/NW	114. Victor Stenlund	Au	Assess	DD 3 - 70.1 m	1981	-	-
Kabamichigama Lake Area (G58)	42E4/NE	115. Jack Stinson	Cu	Assess	DD 3 - 171.9 m	1981	-	-
Ramsay Wright Township (M2092)	52B14/NW	116. Surveymin Ltd. (Nahanni Mines Ltd.)	Au	Assess	GL	1980	-	-
Ramsay Wright Township (M2092)	52B14/NW	117. Nahanni Mines Ltd.	Au	Assess	Mag., EM	1980	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ferguson Lake Area (G249)	52P9/NW	118. The Tantalum Mining Corporation of Canada Ltd.	Ta	Assess	DD 12 - 1225 m	1980	-	-
Ferguson Lake Area (G249)	52P9/NW	119. The Tantalum Mining Corporation of Canada Ltd.	Ta	Assess	DD 3 - 408.4 m	1980	-	-
Summit Lake Area (G136)	42L5/NE	120. Texasgulf Canada Ltd.	Bm	Assess	A.Mag., A.EM	1980	-	-
Red Horse Lake Area (M2435)	52C8/NW	128. E. B. Turner	Au, Mo, Cu, Ni	Non-Assess	Assays	1958	-	-
Norton Lake Area (G355)	42M14/NW	121. Wasabi Resources Ltd.	Cu, Ni	Assess	DD 7 - 941.8 m	1981	-	-
East of Norton Lake Area (M2762)	42M14/NW	122. Wasabi Resources Ltd.	Cu, Ni	Assess	DD 1 - 158.2 m	1981	-	-
Norton Lake Area (MG355)	42M14/NW	123. Wasabi Resources Ltd.	Cu, Ni	Assess	A.EM	1970	-	-
Metcalfe Lake Area (G84)	42L4/NE	124. Walter Yzerdraat	Au	Assess	VLF	1980	-	-
Metcalfe Lake Area (G84)	42L4/NE	125. Walter Yzerdraat	Au	Assess	Rad.	1980	-	-
Metcalfe Lake Area (G84)	42L4/NE	126. Walter Yzerdraat	Au	Assess	Mag., GL	1980	-	-
Metcalfe Lake Area (G84)	42L4/NE	127. Walter Yzerdraat	Au	Assess	EM	1981	-	-
Metcalfe Lake Area (G84)	42L4/NE	135. Walter Yzerdraat	Au	Assess	GL	1980	-	-

groups, making presentations to Junior Ranger Camps, and giving talks on local geology to prospectors classes and schools. B. R. Schnieders gave a paper on gold mineralization in the Atikokan area to the District 4 Annual Meeting of the Canadian Institute of Mining and Metallurgy, held in Thunder Bay. He also gave a talk on the interpretation of airborne geophysical maps to prospectors in the Atikokan area at the time of the release of the Ontario Ministry of Northern Affairs-Ontario Ministry of Natural Resources geophysical maps. B. R. Schnieders and J. K. Mason also presented very successful displays at the Ontario Geological Survey Geoscience Research Seminar held in December in Toronto.

The office staff continued to be involved in land use planning by providing geological input into proposed land and park reserves, environmental issues, road and proposed transmission line placements. One staff member (F. J. Kristiansson) appeared as a witness before an Ontario Municipal Board hearing concerning the location of a gravel pit operation.

Mining Activities

Metallic Mines

The two major metal producers in the North Central Region include the Noranda Mines Limited (GECO Division) copper-zinc mine at Manitouwadge (3), and the

Inco Metals Limited nickel-copper mine (2) at Shebandowan. The former was in continuous production all year and the Shebandowan Mine closed for a vacation period during the month of July.

Algoma Development Company continued to process ore from its Crooked Green Creek Mine in Pifher Township (1). About 350 tons of ore was trucked to the Northern Concentrators custom mill in Thunder Bay.

Mines under development (Figure 1) are all potential gold producers and are all in the Beardmore-Geraldton area; these include: the Consolidated Louanna Gold Mine (1) on O'Sullivan Lake, the Pan-Empire Joint Venture (4), Goldwater Mines Limited (2) and the Greenoaks (3). The latter three mines are near Beardmore, and are in various stages of development. These mines are described in more detail in the Beardmore-Geraldton section of the economic geologists program (this volume).

Industrial Minerals

Amethyst production came mainly from operations in McTavish Township, northeast of Thunder Bay; these include the deposits of Gunnard Noyes (4), the Ontario Gem Company (5), and Thunder Bay Amethyst Panorama (6). The Little Bear Quarry north of Nipigon also produced amethyst during the summer.

NORTH CENTRAL — THUNDER BAY

TABLE 2

EXPLORATION ACTIVITY DURING THE YEAR.

Number on Figure	Individual or Company	Activity
1	Amax Exploration, Inc.	Diamond drilling for gold and base-metal deposits in the Metcalfe Lake area north of Geraldton
2	Amoco Canada Petroleum Co. Ltd.	Geophysics in the Peeagwon Lake area
3	Bel-Air Resources Ltd.	Preliminary geological work on the gold property in the Hemlo area
4	Camflo Mines Limited	Exploration for gold on Fern Elizabeth property west of Atikokan
5	Cominco Limited	Geological and geophysical work on gold base-metal property in the Pine Cone Lake area
6	Corona Resources	Approximately 24,500 metres of diamond drilling outlining a large low-grade gold zone in the Hemlo area
7	Corporation Falconbridge Copper	Geophysics and geology in Marshall Lake base-metal area
8	Corporation Falconbridge Copper	Geophysics around the old Zenith Zinc Mine northwest of Schreiber
9	B. Cowan	Geological mapping around the old Empress Gold Mine east of Terrace Bay
10	Esso Minerals Canada	Geology in the Richardson Lake area north of Atikokan
11	Gold Fields Mining Corporation	Geological and stripping on gold property near Beardmore
12	Gossan Resources Limited	Linecutting and geophysics on gold, base-metal property in Baker Township
13	C. D. Huston	Linecutting and geophysics on gold property in Richardson Lake area
14	C. D. Huston	Linecutting and geophysics on gold property in Calm Lake area
15	INCO Metals Co.	Diamond drilling and mapping in Walsh Township on gold base-metal property
16	T. Johansen	Stripping on gold property in Leduc Township near Geraldton
17	T. Johansen	Stripping on gold property in Leduc Township near Geraldton
18	T. Johansen	Stripping on gold property east of Geraldton
19	Lynx-Canada Explorations Limited	Geology on gold property in Walters Township
20	Mattagami Lake Exploration	Geochemistry in Whitefish Lake area west of Thunder Bay
21	Mining North Exploration Ltd.	Stripping and drilling on Lumby Lake gold, base-metal property
22	Douglas Mychashiw	Stripping on Hawk Bay (Marmion Lake) gold property
23	Eric Nelson	Bulk sampling from Thunderhead Gold Mine in Gorham Township, north of Thunder Bay
24	Noranda Exploration Company Limited	Diamond drilling on Hayes Lake gold property of Walker Asker's, near Schreiber
25	Q. C. Explorations Ltd.	Bulk sampling of dump material from Silver Islet Mine
26	Roxmark Mines Ltd.	Geology and geophysics on Magnet and McLellan properties near Geraldton
27	Saarberg Interplan Canada Ltd.	Reconnaissance exploration for uranium in Sibley Basin
28	Philip Sawdo	Stripping on gold, base-metal property east of Crooked Pine Lake
29	Sheridan Platinum Group Limited	Bulk sampling on Lac des Iles platinum property
30	Steepprock Iron Mines Limited	Geology on feldspar property in Goldie Township west of Thunder Bay
31	Teck Corporation	Diamond drilling at the Leitch Mine near Beardmore
32	Tri-ven Minerals	Sampling and improvement of access to marl property near Shillabeer Lake
33	Uranerz Exploration and Mining Ltd.	Reconnaissance for uranium in Sibley Basin and Terrace Bay area
34	Westfield Minerals Ltd.	Geology on gold prospect in Piske Township near Schreiber

TABLE 3

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1970	5,830	4,192	10,417	103,559	83,389	6,078	198,791
1971	4,627	5,211	9,833	63,774.25	53,028	7,456	131,962.72
1972	3,442	5,091	8,184	61,512.2	53,757.5	4,776	131,393
1973	2,253	5,515	4,922	49,575	24,320	7,450	94,308.6
1974	3,305	3,391	5,837	37,130.5	26,061	4,300	80,559.2
1975	3,436	2,869	6,404	38,652	52,020	4,700	105,338
1976	2,364	3,552	6,079	52,551.6	29,504	4,600	101,025.8
1977	1,964	2,966	5,077	24,879	25,601	4,870	68,727
1978	3,517	1,982	6,612	20,182	20,589	6,206	51,299
1979	3,099	2,139	7,554	11,528	69,612	14,727	101,799
1980	5,527	1,836	11,245	53,418	57,483	5,372	127,288
* 1981	6,768	4,162	13,851	55,256	172,366	13,863	256,686

* To November 30.

Claim Staking Activity

The total number of claims staked in the North Central Region was 6 768 (to November 30), which represents a 22.5 percent increase over the 5 527 claims staked in 1980. The number of active claims in the region as of November 30 stood at 13 851. A summary of staking activity in the region back to 1970 is shown in Table 3. The main areas of staking activity are outlined below.

Hemlo

The results obtained by Corona Resources Limited initiated a staking rush in the Hemlo area. About 800 claims have been staked in the North Central Region in the anticipation of finding similar large low grade gold deposits. More claims have also been staked in the area south of the Canadian Pacific Railway tracks.

Norton Lake Area

The Norton Lake area is approximately 75 km northeast of Fort Hope and encouraging copper-nickel assays from Wasabi Resources Limited has lead to the staking of approximately 2 000 claims.

Beardmore-Geraldton

The Beardmore-Geraldton area has also been the scene of intense staking as a result of renewed interest in re-examining many of the old gold occurrences. More

detailed information is found in the section "The Beardmore-Geraldton Economic Geologists Program" (this volume).

Other Areas

As a result of the release by the Ontario Geological Survey of the airborne electromagnetometer and magnetometer surveys in the Atikokan area, staking activity increased in this area and has been steady throughout the year.

Approximately 350 claims have been staked for the purpose of exploration for uranium; 257 of these claims were staked by Saarberg-Interplan Canada Limited in McTavish Township. The other major claim holders are Uranerz Exploration and Mining Limited and Eldorado Nuclear Limited.

Exploration Activity

Despite the weakening of base-metal and uranium markets, an overall increase in exploration activity in the North Central Region can be accredited to interest in gold. This is reflected not only in the previously discussed staking activity, but also in the record total of 256 686 man days of assessment credit (Table 3). The main areas of exploration have been Moss Township, Marshall Lake-Gripp Lake, Caribou Lake, Terrace Bay-Schreiber, Hemlo, and the Norton Lake area. Exploration activity was also high in the Atikokan and Beardmore-Geraldton

areas; these areas are described separately in this report. Table 1 summarizes the assessment work and other information added to the files during the year. Table 2 indicates the activities of companies and individuals who were working in the region and for which no data has been filed.

Corona Resources Limited

One of the better discoveries this year was by Corona Resources Limited in the Hemlo area about 35 km east of Marathon. The ore zone which has been outlined has the potential to be a large low grade gold deposit amenable to both open pit and underground mining.

General Geology

Gold mineralization occurs in a quartz-sericite schist and a mafic volcanic rock referred to by the company as "spotted mafic schist". According to T.L. Muir (1980), the mineralization appears to be associated with a persistent structural feature known as the Lake Superior Shear Zone, striking about N70°E, and parallel to the major faults in the area.

The gold mineralization occurs in a pyrite-rich zone that has locally visible gold.

Grade, Dimensions, and Tonnage

As a result of about 24 500 m of diamond drilling, the ore zone has been delineated over a strike length of about 450 m and is open on the east. The zone ranges from 3 to 20 m wide with a width average of about 5 m. The west zone contains 628 260 tons averaging 0.15 ounce per ton gold over a width of 4.56 m. The east zone has 675 500 tons assayed at 0.25 ounce per ton gold.

In early December 1981, it was announced (The Northern Miner December 10, 1981) that Teck Corporation had come to an agreement with Corona Resources Limited to take over the operation of the property and to conduct production feasibility studies.

Stenlund (Heron Bay Gold and Silver Mine) Occurrence

Victor Stenlund, of Dorion, Ontario, has 22 unpatented contiguous claims in the vicinity of Heron Bay in Pic Township.

History

In 1872, two quartz-carbonate veins were discovered near Heron Bay by prospectors. McKellar (1874, p. 23) stated:

The veins lie within a mile or so of Heron Bay; at the surface their widths vary from one to four feet, composed of vitreous quartz with some bitter spar

One of these veins (Vein 1) seems to conform in dip and strike with the slates, which strike about east-northeast, with a dip nearly vertical.

The other (Vein 2) bears nearly north and south, intersecting the slates. Upon this a shaft was sunk some 40 feet last

winter. The lode is said to be much wider at the bottom and richer in ore than at the surface, it having opened out to five or six feet.

Specimens . . . yielded . . . gold and silver, averaging . . . about \$70 of each.

Strickland (1979, p. 139), stated:

According to a report from Mr. McDermott in charge of Heron Bay, the results were very encouraging. . . . There are two shafts sunk on a vein, distance apart . . . 150 feet, average size of vein between shafts three and one half feet, size of number 1 shaft 8 ½ x 10 ½, depth 66 feet.

The principal mineral found in sinking the first 35 feet was copper ore, zinc, lead, with gold and silver. At 35 feet we struck a rich deposit of gold and silver, and less copper than above, this deposit is about 18 inches thick along the hanging wall and continues east and west, thickness of vein at 40 feet in depth, six feet with two good walls.

The vein underlying to the south continues rich to the bottom of the shaft but not quite so rich as between 35 and 40 feet. Size of vein at the bottom of the shaft is six feet . . .

Number two shaft is six by eight feet, the vein is the same as in number 1 shaft to a depth of 30 feet where it leaves more to the hanging. The shaft was sunk perpendicular which leaves the vein from four to six feet from the bottom of the shaft There is about ten tons of number two ore at the bay ready for shipment and about 100 tons of number two ore at the mine.

In 1937, Bowhill Mines Limited held 39 unpatented claims at Heron Bay. Bayne (Resident Geologist's Files, Ontario Ministry of Natural Resources, Thunder Bay), stated:

The most intensive work has been concentrated on the south zone which lies south of the railway track. Here an open cut has been worked out over an average width of about nine feet for a length of 200 feet approximately 25 feet deep. A test shipment of ore to the Ottawa Ore Dressing Laboratory showed an average gold content of 0.30 ounce in gold and 1.53 ounce in silver in a 500 pound sample which was used for mill test.

No further work was recorded, and Bowhill Mines Limited lost its charter in 1936.

Recent Work and Property Visits

The Resident Geologist's staff visited the Stenlund property in 1981 and sampled veins one and two. Vein one, on which Bowhill Mines Limited did most of its trench work, trends approximately 50° and dips 55° northwest. The vein pinches and swells and can be traced for a strike length of 106 m. The central 42 m strike length of the vein is the widest part, and varies from 0.49 to 0.90 m in width. Assay results of chip samples taken from this part by the authors include: 0.9 m assayed 0.09 ounce of gold per ton, 1.14 ounces of silver per ton, 0.12 percent copper, and 0.09 percent lead; 0.76 m assayed 0.04 ounce of gold per ton, 0.76 ounce silver per ton, 0.08 percent copper, 0.15 percent lead, and 0.64 percent zinc (Assays by the Geoscience Laboratories, Ontario Geological Survey, Toronto).

A second quartz-carbonate vein (vein two) was located in an open cut 128 m west of Highway 627 and 60 m south of the Canadian Pacific Railway tracks. This vein trends 100° and dips 70° north. An 0.82 m chip sample assayed 0.22 ounce gold per ton and 3.00

ounces per ton silver. A shaft was located approximately 90 m to the west of the open cut. A grab sample of the quartz-carbonate dump material assayed 0.08 ounce of gold per ton and 0.15 ounce of silver per ton.

In 1979 and 1981, Stenlund drilled several holes in the area.

The property appears to have good potential for gold and silver and needs a comprehensive exploration program.

Uranium

As a result of the discovery of high grade uranium deposits in Northern Saskatchewan towards the end of the 1970s, uranium exploration activity in the North Central Region has declined in the last two to three years. Nevertheless, some exploration is still being carried out and approximately 350 claims were recorded in the North Central Region for the purpose of uranium exploration. The majority of these claims were staked in McTavish Township with the balance staked in the Purdom Township area. Companies that are involved in uranium exploration in the North Central Region include Eldorado Nuclear Limited, Saarberg-Interplan Canada Limited and Uranerz Exploration and Mining Limited.

The Regional Mineral Resources Coordinator's Office initiated a two-year program in 1981, to evaluate the uranium mineral resource in the North Central Region and to document any new occurrence that may have been found by exploration during the last several years.

A file has been started to determine what data are available in the Regional Office at Thunder Bay on uranium. All the uranium references are tabulated under the following headings: Assessment Work, References, Newspaper Clippings, and Assay Reports.

During the summer of 1981, ten uranium occurrences were visited. These property visits were of a cursory nature for familiarization purposes. Properties that are well documented in the literature were not visited at this time, however, these will be visited prior to the completion of the project. Properties will be mapped in detail and samples taken for petrographic and geochemical studies. Occurrences will be characterized as to type, and a model depicting genesis will be developed. Based on this model, areas will be recommended for future uranium exploration in the North Central Region.

With specific reference to the Sibley Basin, a comparison will be made with the Athabasca Region to determine the similarities and differences between the two areas and how these might affect future uranium exploration in the Sibley Basin.

Dorion Amethyst Mine

A cursory examination with a McPhar TV-1 gamma ray spectrometer of the Dorion Amethyst Mines property in McTavish Township during the summer of 1978, indicated that a copper-rich zone near the main calcite/

amethyst vein was radioactive. The highest readings were obtained in the chalcopyrite impregnated breccia zone in mudstone of the Rosspoint Formation. Subsequent analysis yielded the following results: U: 160 ppm; Th: <10 ppm; Cu: 8.16 percent. In 1967, the property was optioned as a copper prospect to Roy Barker who diamond drilled 13 holes for a total length of 551 m. Ten of the 13 holes intersected the Sibley Group/Archean unconformity. The unconformity zone has been described in the logs as a silicified hybrid brecciated zone (Resident Geologists Files, Ontario Ministry of Natural Resources, Thunder Bay). A re-evaluation of the core is warranted in light of recent developments in the Athabasca Region to: a) determine if the described "hybrid zone" is in fact a regolith, and b) to analyse all 13 holes for uranium.

Split Rapids Dam Road Occurrence

During the 1981 field season, R. H. Sutcliffe and Dean Walker, who worked for the Ontario Geological Survey, discovered a minor radioactive zone east of Black Sturgeon Lake. The area of anomalous radioactivity, accessible by bulk road, is located approximately 8.5 km north of the Split Rapids Dam which is situated at the southern extremity of Black Sturgeon Lake.

The showing occurs in a cleared area near the junction of the main bush road and a subsidiary one. Reference should be made to M.E. Coates (1972) for road location.

The highest radioactivity is concentrated in a 30 cm wide northwesterly-trending fracture system. The highest reading was obtained from a 3 cm wide sulphide-rich shear within this fracture system. McPhar TV-1 gamma ray spectrometer readings were as follows: T1: 50 000 (1000) cpm., T2: 2000(30) cpm; T3: 30(20) cpm. The fracture system is in metamorphosed ironstone characterized by amphibole, garnet, and magnetite. The ironstone has a strike of 60° with a presumed vertical dip.

The area around the radioactive zone was stripped for several square metres to better expose the fracture system. Sampling was difficult because the outcrop was relatively smooth. A handful of chips were taken for chemical analysis with the following results: Cu: 370 ppm; Co: 384 ppm; Ni: 176 ppm; U: 1100 ppm; Th: 0 ppm. **The fracture system has a strike of 140° with a presumed vertical dip, and is parallel to the Black Sturgeon Fault.**

Although the showing appears to be rather small on surface, it should be opened up by trenching. The association of uranium with nickel, copper, and cobalt might indicate a potential for Athabasca-type deposits in the Sibley Group.

Black Sturgeon Fault Hematite Occurrences

Hematite alteration appears ubiquitous with uranium mineralization (Northern Saskatchewan; and the Jessie Lake area, the Good Morning Lake area, the Greenwich

Lake area and elsewhere). A.P. Coleman (1909) described numerous hematite occurrences along the Black Sturgeon fault structure. These occurrences are composed of massive to crystalline hematite present in the specular and the typical red earthy variety. Hematite cements brecciated Archean volcanic rocks, quartz, and chalcedony (Coleman 1909). The rocks are intensely weathered and brecciated. The hematite occurrences are concentrated near the mouths of prominent canyons and lineaments where they intersect the Black Sturgeon fault system. Coleman (1909) reported stripping and diamond drilling being done on these showings, mainly on location 94E, but the drilling results are not available. Response to a cursory TV-1 survey was negligible, but not much time was spent in the area. These occurrences should be investigated for possible association of uranium with hematite.

Jessie Lake Area

Several uranium occurrences were discovered by Falconbridge Nickel Mines Limited near Jessie Lake in Purdom Township (Burns 1977). The principle showing is located on the east shore of the elongate southeastern bay of Jessie Lake. Uranium mineralization is contained in a shear zone whose maximum exposed width is 0.76 m and is traceable for a strike length of 224 m. The zone strikes 110° and has a vertical dip. The eastern extension trends into swampy terrain. The shear zone is enclosed by a hematite alteration envelope that extends up to 0.70 m on either side of the radioactive zone.

The zone tends to pinch and swell, and in places exhibits an anastomosing texture. The host rocks are Early Precambrian gneissic granitic rocks. Minute hematite veinlets cut the host rocks and strike parallel to the main shear zone. Amethystine quartz veins are present in the shear zone; the amethyst is generally of poor quality. Samples for uranium analysis were taken with the following results: sample F-62-78: 99 ppm U; 10 ppm Th; and sample F-63-78: 420 ppm U; 360 ppm Th. Further analyses are pending.

Falconbridge Nickel Mines Limited conducted an airborne radiometric survey using east-west lines spaced 200 m apart. It was noted (Resident Geologist's Files, Ontario Ministry of Natural Resources, Thunder Bay) that the airborne survey did not locate any of the main showings. It may be significant that the flight lines were oriented east-west and the uranium-bearing vein systems strike 110° . It is conceivable that the main showings, and perhaps others, were straddled by the flight lines and were not recorded. The Purdom Township area deserves further work.

Industrial Minerals

Calcium Carbonate

Two calcium carbonate deposits received attention during the year. These include a marl deposit in the Black

Sturgeon River area, northeast of Thunder Bay, and a calcite vein along the Gravel River about 44 km east of Nipigon.

The Shillabeer (Milk Lake) Marl Deposit

The Shillabeer Creek (Milk Lake) marl deposit is being developed by Tri-Ven Minerals Limited. The company intends to extract the marl to supply Thunder Bay area farmers with agricultural lime. Production is expected to be in the 5 000 to 10 000 tons per annum range. An access road has recently been constructed from the Man Lake Road to the deposit. Future work includes the construction of an earth dike to restrict the flow of water from Shillabeer Creek into the western part of the lake, (W. Peterson, S. Craigo, personal communication). A conservative estimate of mineable material would be in the order of 200 000 tons with a potential for 5 000 000 tons. The marl consists mainly of calcium carbonate and contains no impurities of consequence.

The Gravel River Calcite Vein

The Gravel River calcite vein occurs in granitic rocks on the east side of the Gravel River about 15 km north of Highway 17. It has been staked by Montane Contractors Limited. The vein is coarsely crystalline, and is 4 to 5 m wide. An analysis of the vein indicates 61.1 percent calcium oxide, 1.56 percent silica, and no magnesium oxide.

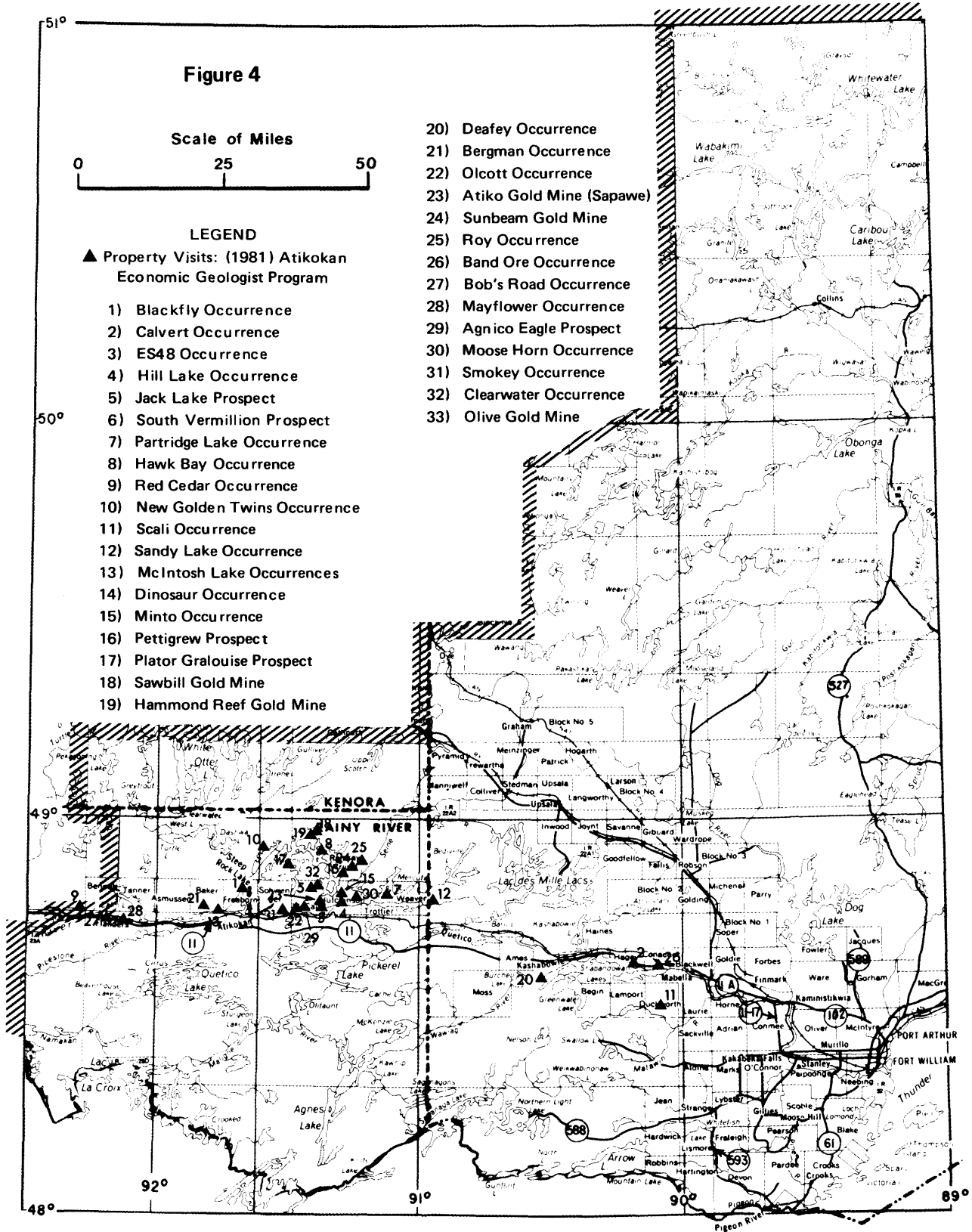
Aggregate

Aggregate Potential Maps

Aggregate potential maps of the Black Sturgeon Lake planning area, Red Rock Improvement District, Thunder Bay City Limits, and McTavish, MacGregor, Paipoonge, Gorham, Ware, Jacques, and Fowler Townships have been prepared by the staff of the Ministry of Natural Resources. These maps represent a direct interpretation and compilation of available Quaternary and engineering geology mapping, Ontario Ministry of Transportation and Communications sand and gravel inventory data, and the Ontario Ministry of the Environment water well records. National Topographic System maps at a scale of 1:50 000 provided a suitable base map. A program of ongoing field verification of the aggregate potential depicted by these maps is presently underway. The maps generally have been well received by the planning community in that they provide a valuable geoscience input to the planning process. Aggregate potential maps of Oliver, Conmee, Neebing, and O'Connor Townships will be prepared in 1982.

Terrace Bay Area

A need for more detailed information regarding the sand and gravel resource base along the north shore of Lake Superior in Terrace Bay District has been identified. A field evaluation, similar to that conducted by Cowan (1976) of the aggregate potential of the Cavers (Gravel River), Terrace Bay, Jackfish Bay, Prairie River, and Neys



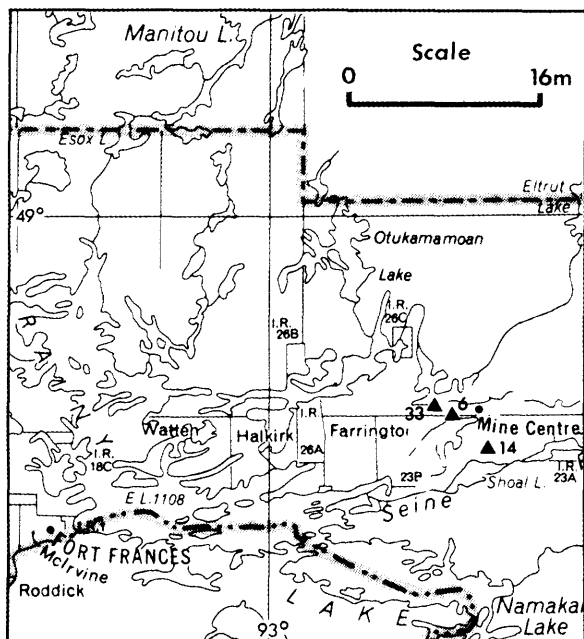


Figure 4a

granular deposits was initiated during the latter part of the 1981 field season. It is anticipated that this field study will be completed early during the 1982 field season. A map of the Quaternary geology, a derived map of the aggregate potential, and a brief summary statement describing each granular source area will be published.

Peat

Tom Gallo and John Sheppard, of the Department of Environmental Chemistry, Ontario Research Foundation, requested assistance during the site selection phase of a study concerning "the feasibility of utilizing a wet oxidation process to recover usable energy from Canada's peat resources" (Sheppard . . . 11.06.1981). They required a rather large volume of peat and indicated that at least an H5-46 (Von Post Scale) degree of humification was required. Following a brief review of available literature, (Graham 1979), it was decided that the Trewartha, Stedman, and Meinzingler bogs offered the best potential for obtaining a sample of fuel-grade peat. Approximately 5 300 pounds of well-humified peat was collected. The results of the study were presented at a "Symposium on Peat" held in October, 1981 in Thunder Bay.

The Atikokan Economic Geologist Program

The purposes of the Atikokan Economic Geologist Program are: 1) to provide assistance to prospectors and mining companies involved in the Atikokan area, 2) to create incentives for mining exploration, and 3) to document both old and new mineral occurrences. The program embraces an area from Shebandowan Lake west to Rainy Lake. The program, funded by the Ontario Ministry of Northern Affairs, completed its third year of operation during 1981 and 1982 and is scheduled for one more year.

Over 20 companies are working in the area and brief descriptions of some of these follow:

Camflo Mines Limited commenced exploration of the Elizabeth Prospect (Baker Township) and the Hill Lake Occurrence (Hutchinson Township), completing geophysical and geochemical surveys, geological mapping, sampling, and prospecting. Drilling will commence in early 1982.

Placer Development Limited worked on the Olcott Prospect in McCaul Township; this included geophysics, geological mapping, and a drilling program.

Steep Rock Iron Mines Limited carried out exploration programs on several properties in the McCaul Township and Lumby Lake areas.

Lynx-Canada Explorations Limited carried out exploration on the Pothole occurrence, north of Crooked Pine Lake, including geophysics, geological mapping, and sampling. Lynx-Canada Explorations Limited has recently allowed this option to lapse.

Nahanni Mines Limited continued exploration on the Sunbeam and Roy properties, carrying out geophysical surveys, geological mapping, and a diamond drilling program. Selected grab samples collected from the dump of the Sunbeam Mine assayed up to 25 ounces of gold per ton.

Mining North Explorations Limited continued exploration on the Lumby Lake base-metal and gold property. Geophysical, geochemical, and geological mapping programs were conducted, as well as stripping, trenching, and sampling.

Fern Elizabeth Gold Exploration Company Limited examined several properties. Drilling and trenching on the Plator Gralouise Prospect encountered quartz with visible gold and a recent discovery, the Smokey occurrence, showed encouraging results. Prospecting and sampling programs were also conducted on the Law, McIntosh Lake, Bergman, and Moose Horn occurrences.

Mattagami Lake Exploration Limited continued exploration on the Band Ore Gold Mines Limited option near Shebandowan completing geophysical surveys, geological mapping, sampling, and a diamond drill program.

Asamera Incorporated and Raven River Resources Limited optioned the Jack Lake Prospect and Olive Gold Mine respectively, and exploration programs are planned for 1982.

Thirty-three property visits were made by the Resident Geologist and his staff in 1981; descriptions of five of these follow.

The Olive Mine

The Preston or Olive Mine is about 7 km west of Mine Centre. Initially discovered in the late 1800s, the recorded production between 1897 and 1942 is 3 572 ounces of gold and 353 ounces of silver. The average production grade was 0.49 ounce of gold per ton.

Development work consisted of four shafts with the main or number 1 shaft being a 2-compartment inclined (70°) shaft, sunk to a depth of 76 m, with levels at 18, 41, and 74 m. The workings were dewatered to the 41 m level in 1942.

Quartz veins up to 64 cm wide are hosted by layered, foliated, and silicified felsic volcanic rocks with small horizons of chert. This unit is intercalated with intermediate to mafic porphyritic flows. The rhyolite is locally tuffaceous and mylonitic. The main vein strikes 264° and dips 70° to 76° south.

The quartz vein varies in texture from coarse-grained saccharoidal quartz to fine-grained smokey-blue quartz. Visible mineralization is exposed for 500 m and includes pyrite, pyrrhotite, chalcopyrite, graphite, and gold. Minor parallel quartz veinlets were also observed in the shaft and dump areas.

Selected grab samples assayed over 11 ounces of gold per ton and 2.17 ounces of silver per ton. Chip samples gave results of 0.58, 0.26, 0.89, and 0.22 ounce of gold per ton across 2 and 2.5 m widths. Samples of the rhyolite host assayed trace and 0.01 ounce of gold per ton.

The Olive Mine is presently owned by a partnership including A. LaFreniere and R. Pitkanen of Fort Frances. Recent exploration includes stripping, trenching, and sampling. The Olive Mine has been optioned to Raven River Resources Corporation.

Plator Gralouise Prospect

The Plator Gralouise Prospect is on the west side of a large island in Marmion Lake, approximately 15 km northeast of Atikokan.

A 2-compartment vertical shaft was sunk in 1953 to a depth of 83 m with levels at 38 and 76 m. Approximately 1 100 m of underground drilling discovered nine parallel veins. Surface work was carried out on 22 veins for a total of over 300 m.

The quartz vein on which the shaft is sunk strikes 26° and dips near vertically. The vein varies in width from 10 cm to 2 m, including a sheared granite-quartz vein

zone. Evidence of post deformation reshearing is present and a vertical fault striking 72° was observed. The quartz vein is hosted by an altered, massive, recrystallized tonalite to granodiorite rock that had been subjected to extensive epidotization. A large mafic xenolith and chlorite schists subparallel to the northeast faults are present.

Sulphide mineralization is scarce; however, mineralization includes epidote, ankerite, calcite, chlorite, chalcopyrite, hematite, native copper, and visible gold. Visible gold occurs along chlorite-epidote slickensides in the vein area.

An estimated 8 000 to 10 000 tons of dump material are present. Apparently, this contains little vein material.

Recent exploration up to 230 m south and southeast has discovered several quartz veins with visible gold mineralization, pyrite, chalcopyrite, and green chromium muscovite.

The Plator Gralouise Prospect is presently held by the Fern Elizabeth Gold Exploration Company Limited, and recent drilling has apparently intersected visible gold mineralization.

Assays of selected grab samples indicate up to 3.12 and 1.36 ounces of gold per ton. One chip sample assayed 0.08 ounce of gold per ton across a width of approximately 2 m.

The Sawbill and Hammond Reef Mines

The Sawbill and Hammond Reef Mines are on the east shore of Sawbill Bay of Marmion Lake about 25 km northeast of Atikokan. Both were discovered in the late 1800s.

The Sawbill Mine produced 1 009 ounces of gold and 72 ounces of silver from 1897 to 1899 and 1940 to 1941; the average grade was 0.19 ounce of gold per ton.

The Hammond Reef Mine produced 222 ounces of gold during 1897 with an average production grade of 0.22 ounce of gold per ton. Both gold properties are of the Marmion lake Batholith type defined by Wilkinson (1980).

The Sawbill Mine consists of a quartz-carbonate vein averaging approximately 1 m in width exposed over a possible strike length of about 400 m. The vein varies in strike from 34 F9 to 56 F9 and has a dip varying from 70 F9 to 75 F9 north. Three shafts were observed by the field party on the property; the main shaft is 75 m deep with levels at 18 m, 37 m, and 57 m. The quartz-carbonate vein is hosted by a massive tonalite and secondary tensional veins display reshearing and secondary deformation. Visible mineralization includes pyrite, chalcopyrite, galena, ankerite, epidote, green chromium muscovite, and gold. Four selected grab samples assayed 0.40, 0.37, 0.23, and 0.17 ounce of gold per ton. A chip sample assayed 0.04 ounce of gold per ton over 1 m respectively.

Several other veins have been reported on the property. Remnants of the mill, headframe, and machinery

are present; however, no recent work has been performed. The Sawbill Mine is owned by J. P. Manley.

The Hammond Reef Mine consists of a system of quartz-carbonate veins hosted by sheared and altered massive tonalite. This sheared and altered zone is up to 152 m in width; it is likely to be a fault extension related to the Sawbill Mine. Previous development and exploration includes numerous shafts, open stopes trenches, and adits over an estimated strike length of 2 km. Estimated tonnages and grades indicate 2 million tons at 0.20 ounce gold per ton to a depth of 30 m. The zone strikes from 20 F9 to 64 F9 and dips from 66 F9 to 86 F9 north. Selected grab samples assay up to 0.16 ounce of gold per ton and chip samples assay 0.05 ounce of gold per ton across 2.5 m.

The Hammond Reef Mine property is presently held by Falconbridge Nickel Mines Limited.

Sandy Lake Occurrence

The Sandy Lake occurrence is 50 km east of Atikokan and approximately 198.5 km northwest of Chief Peter Lake. The occurrence was discovered by prospector P. Sawdo of Eva Lake while conducting follow-up prospecting on Questor Input anomalies observed on the Ontario Ministry of Natural Resources–Ontario Ministry of Northern Affairs maps released in January 1981.

A near vertical quartz-carbonate vein striking 120° and up to 3 m wide has a length of 10 m. An extensive shear zone strikes from 85° to 125° and persists for several km through the area. The vein is hosted by tuffaceous, intermediate to mafic metavolcanics. Porphyritic basalts, as well as intercalated felsic and tuffaceous units were also observed in the surrounding area. Visible mineralization includes pyrite, chalcocopyrite, malachite, azurite, and galena. Grab samples collected by one of the authors (Schnieder) assayed up to 0.02 ounce of gold per ton and up to 3.93 percent copper.

A boulder of fragmental metavolcanic rock was discovered, and consists of a mafic matrix and felsic fragments. Chalcocopyrite was observed and initial assays indicate 0.04 ounce of gold per ton and 0.84 ounce of silver per ton and 0.42 percent copper. Further prospecting discovered large quartz boulders in the lake bottom containing both chalcocopyrite and galena. Geophysical evidence indicates strong Questor Input electromagnetic anomalies around and under Sandy Lake.

The Sandy Lake occurrence is presently staked by P. Sawdo, and further exploration is warranted due to both gold and base-metals potential.

South Vermilion Prospect

The South Vermilion, (Verlac, or Pacitto) Prospect is on the north shore of Bad Vermilion Lake, approximately 5 km southwest of Mine Centre. The property comprises three patented claims, F.F. 1536, 1537 and 1538. The property contains eleven known quartz veins with 6 receiving most of the work. Development in the mid-

1930s, consisted of 14 pits or trenches, a 35 m shaft with minor drifting, and surface sampling.

The major vein consists of the Number 4 vein on which the shaft is sunk, striking 130° and dipping 80° northeast. The vein averages 45 cm in width and is exposed for a 90 m strike length. Previous analytical results indicated values of up to 3.8 ounces per ton gold. Selected grab samples of vein and dump material collected by one of the authors (Schnieders) assayed up to 0.79 ounce of gold per ton and 0.66 ounce of silver per ton.

The Number 2 vein strikes 115° and dips 85° northeast; it has been exposed for 53 m and remains open at both ends. At the eastern extension, a 7.5 m by 2 m open cut exists, and the vein observed was 7.5 cm wide. Visible gold was noted. Previous chip samples indicated values of 0.12 ounce of gold per ton across 75 cm, 0.04 ounce of gold per ton across 20 cm, and 0.72 ounce of gold per ton across 60 cm. Selected grab samples of dump and vein material assayed up to 1.07 ounces of gold per ton and 0.25 ounce of silver per ton. A 135 kg bulk sample collected from this property by previous workers assayed 0.98 ounce of gold per ton, 0.34 ounce of silver per ton and 0.17 percent copper.

The Number 1 vein is east of the Number 2 vein, on claim FF1536. The vein strikes from 270° to 290° and dips 80° south to vertical. The vein has an average width of 25 cm. A grab sample collected by one of the authors (Schnieders) assayed 0.05 ounce of gold per ton.

The quartz veins are hosted by altered mafic metavolcanics which have been intruded by granitic stocks. Visible mineralization includes chlorite, ankerite, carbonate, chalcocopyrite, and gold.

The South Vermilion is presently owned by W. Ojala of Aurora, Minnesota.

Recommendations For Exploration

Base Metals

Numerous anomalies and targets for exploration are delineated on the airborne electromagnetic maps released by the Ontario Geological Survey for the Atikokan area in 1981.

Base-metal potential in the Lumby Lake, Finlayson Lake, Calm Lake, and Mine Centre areas should be further explored utilizing the geophysical results.

Ultramafic intrusions throughout the area should be re-examined and re-explored, determining the base-metal and platinum group element content.

Gold

Gold exploration in the Atikokan area has been carried out since the 1870s. S.J. Wilkinson (1980) defined three major types of gold mineralization as follows: 1) the Marmion Lake Batholith type; 2) The contact zone type; and, 3) the volcanic hosted-stratabound type.

Gold mineralization in the Marmion Lake Batholith type is related to north-northeast trending lineaments and faults, and should be fully explored. Metavolcanic-granitic contact zones should be explored, as recent prospecting uncovered to new and spectacular gold occurrences in the area. Carbonate and carbonatized units associated with volcanic hosted-stratabound type gold mineralization should be explored. It is suggested these units represent vent systems which transported and concentrated gold mineralization, by circulating hydrothermal solutions during submarine exhalative activity.

Sulphide and oxide ironstone should also be sampled and assayed for gold mineralization due to theoretical relationships between Early Precambrian ironstone and lode gold deposits.

Many of the gold properties discovered in the late 1800s and early 1900s remained dormant for several decades. Exploration in the Atikokan area should include re-examination of these properties, as well as detailed prospecting and exploration in favourable adjacent environments. Stripping and trenching in order to get a two dimensional understanding of the mineralized vein is required. Drilling can often tend to be misleading because of the erratic nature of the deposits.

The Atikokan area has never been considered a successful gold producer. The reasons for this must be attributed to a combination of circumstances. E.L. Bruce (1925) stated that in many cases, the veins developed were too small, or contained low gold values. Work was done in a haphazard way, and funds were exhausted before the properties were fairly tested. Some mines were profitable in a small way; however, ambitious directors attempting to make large mines caused disastrous results. Also gold production was not always reported and high grade ore was commonly smuggled across the American border. Early production lacked modern milling methods of fine grinding and cyanidation.

In conclusion, exploration programs on a reconnaissance scale following a prior conceived geological-genetic model may discover potentially larger mineralized zones. Previously discovered properties must be re-evaluated while considering the centrally located mill concept.

Beardmore-Geraldton Economic Geologist Program

In April 1981, the Beardmore-Geraldton Economic Geologist's Program was initiated by the Regional Mineral Resources Coordinator's Office, Thunder Bay. The program is jointly funded by the Ontario Ministry of Northern Affairs and the Federal Department of Regional Economic Expansion under the Northern Ontario Rural Development Agreement. The objectives of the program are: to assist prospectors and mining companies in the Beardmore-Geraldton area to document new mineral occurrences, gather new data on mineral occurrences,

and to help revise the Tashota-Geraldton compilation map. The Beardmore-Geraldton area straddles the Wabigoon Metavolcanic Belt and Quetico Gneiss Belt.

The Northern Empire Mine (Pan-Empire Joint Venture), Consolidated Louanna Gold Mine, and Brenbar Mine (Goldwater Mines) are gold mines in the development stages, scheduled for production in 1982. The Crooked Green Creek Mine in Pifher Township was the only gold producer in 1981 (minimum 100 tons of ore).

A total of 30 properties were visited, some several times.

Summary reports of selected property visits are found in this report.

Other exploration activity not described under property visits was mainly for gold. Amax Exploration Incorporated conducted a diamond drill program in the Tashota area. Amoco Canada Petroleum Company Limited undertook geochemical humus sampling work and drilling in the Jellicoe-Geraldton-Longlac area. Dome Exploration (Canada) Limited diamond drilled west of Geraldton in the Wildgoose Lake area. Goldfields Mining Corporation conducted a stripping, trenching, and mapping program in Summers Township. Goldwater Mines Limited bulk sampled the Buffalo-Beardmore gold property, Summers Township. Hillsborough Explorations Limited undertook a sampling and mapping program on the Chellew property, Pifher Township. Hudson Bay Exploration and Development Company Limited carried out a diamond-drill program in Ashmore Township. Mattagami Lake Explorations Limited conducted an exploration program on a gold property in the Coyle Lake Stock, Pifher Township. Quebec Sturgeon River Mines Limited bulk sampled the production veins on the Quebec Sturgeon River Mine, a past-producer (73 438 ounces of gold) in Irwin Township.

Tantalum Mining Corporation Limited undertook geological mapping in the Crescent Lake area for lithium and tantalum.

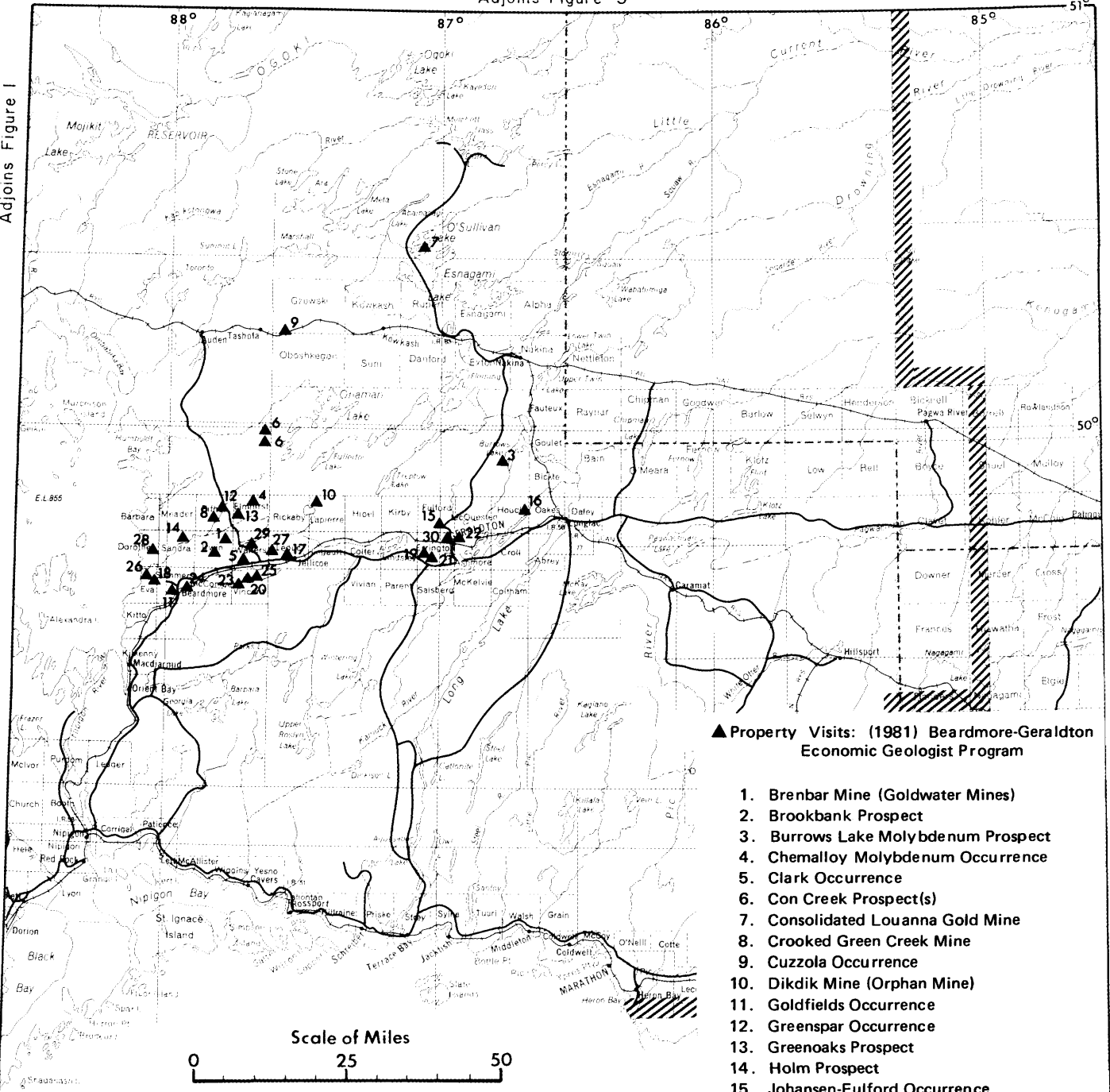
Corporation Falconbridge Copper optioned the N.W.T. Copper Mines Limited property near Marshall Lake, northwest of Nakina, where 2 000 000 tonnes of 1.22 percent copper, 4.2 percent zinc, 2.40 ounces per ton silver, and 0.012 ounce of gold per ton have been outlined (Canadian Mines Handbook, 1980-81).

The Ontario government sponsored GOMILL (Custom sampling mill) program will announce an award for financial assistance for placing a custom gold milling facility in the Beardmore-Geraldton area early in 1982.

Magnet Mine (Roxmark Mines)

McLellan Prospect (Roxmark Mines) Lynx Canada Exploration Canadian Reynolds Metals)

Roxmark Mines Limited is continuing exploration on the contiguous Magnet-McLellan properties in Errington Township, west of Geraldton. From 1938 to 1943 and



▲ Property Visits: (1981) Beardmore-Geraldton Economic Geologist Program

1. Brenbar Mine (Goldwater Mines)
2. Brookbank Prospect
3. Burrows Lake Molybdenum Prospect
4. Chemalloy Molybdenum Occurrence
5. Clark Occurrence
6. Con Creek Prospect(s)
7. Consolidated Louanna Gold Mine
8. Crooked Green Creek Mine
9. Cuzzola Occurrence
10. Dikdik Mine (Orphan Mine)
11. Goldfields Occurrence
12. Greenspar Occurrence
13. Greenoaks Prospect
14. Holm Prospect
15. Johansen-Fulford Occurrence
16. Johansen-Houck Occurrence
17. Johansen-Jellicoe Occurrence
18. Leitch Gold Mine (Teck Corporation)
19. Magnet Mine (Rox Mark Mines)
20. Maki Occurrence
21. McLellan Prospect (Rox Mark Mines)
22. Mikulic Occurrence
23. Nelson Occurrence
24. Northern Empire Mine (Pan-Empire Joint Venture)
25. Pichette Occurrence
26. Rutherford Occurrence
27. Solomon's Pillars Prospect (Lynx-Canada Explorations Ltd.)
28. Tyson Mine
29. Warren Occurrence
30. Wilkinson Occurrence

Figure 5

Mine - Including Developing Mines, and Past Producers with a minimum production of not less than 100 ounces of gold

Prospect - With significant development work usually consisting of one or more of the following:
 (a) Production of less than 100 ounces of gold;
 (b) Over 30 m of underground lateral development work;
 (c) Over 600 m of diamond drilling

Occurrence - Little development work carried out

1946 to 1952, the Magnet Mine produced 152 089 ounces of gold and 16 879 ounces of silver with average grades of 0.42 ounce per ton gold and 0.05 ounce per ton silver.

A grid was cut over both properties and ground geophysics, stripping (McLellan), sampling, geological mapping, and diamond drilling followed. Drilling on the Magnet Mine ground was done northwest of the shaft in the area of the Wells vein. Encouraging values were obtained with the best intersection being 0.44 ounce per ton gold over 2.1 m from 3 holes totalling 976.5 m (The Northern Miner November 12, 1981). Diamond drilling 200 m east of the McLellan shaft produced good results in two holes out of five. Two parallel zones, one in banded ironstone and the second in fine, chloritic, metasediments, were intersected and indicated encouraging gold values. One hole intersected 19.5 m of 0.06 ounce per ton gold and the second, 7.5 m of 0.11 ounce per ton gold.

Data are being compiled and further drilling will commence in 1982. The company hopes to intersect shallow, westerly plunging MacLeod-Cockshutt type ore.

Consolidated Louanna Gold Mine

Development work and mill construction is continuing on the Consolidated Louanna Gold Mine, on O'Sullivan Lake, 35 km north of Nakina with production scheduled for early 1982. Cumo Resources Limited is backing the operation, and Graham Mining Limited is the developer and future operator.

Initial tonnage and grade figures indicated 113 000 tons of ore grading 0.352 ounce of gold per ton. A new production ramp has been driven to intersect the old mine workings; drilling from this ramp has identified a new ore zone parallel to the original. Tonnage and grade figures are not available.

The original development work done in the 1940s comprised a shaft to 120 m with levels at 45 and 91 m. The new ramp, which is inclined at 18°, has intersected the 91 m level.

Pyrite, pyrrhotite, arsenopyrite, and gold occur in two parallel quartz veins (The Northern Miner September 24, 1981) hosted by mafic tuff, andesite, and quartz-feldspar porphyry. The quartz appears as a composite vein 6 to 8 m wide on the 45 m level.

The mill will handle 200 tons of ore per day and can produce concentrate only, due to the high arsenic content. The concentrate will be trucked to the United States for smelting.

Leitch Gold Mine (Teck Corporation)

Teck Corporation owns the Leitch Gold Mine in Eva Township. The Leitch Gold Mine produced 847 690 ounces of gold and 31 802 ounces of silver from 1936 to 1968 with average grades of 0.92 ounce per ton gold and 0.03 ounce per ton silver. The last production was in 1980 when 50 000 tons of screened dump material was trucked to Lamaque, Quebec for milling.

Ground geophysics with two follow-up diamond-drill programs totalling 4393.5 m were completed during the year. Gold values in quartz vein intersections were generally low except for Number 16 vein which has possibilities for open cut development.

The company also completed a program to survey and grid sample tailings.

Teck Corporation is considering heap leaching the dump material in 1982; initial testing has indicated the dump material, after screening, is amenable to this process.

Maki Occurrence

The Maki Occurrence is located on claims TB459787, TB418431, TB513154 and TB535289, Vincent Township.

Gold-bearing quartz-carbonate veins containing chalcopyrite, pyrrhotite, and galena with varying attitudes occur on the property. The quartz is milky, white, massive, saccharoidal and can contain epidote, tourmaline, chlorite, and hematite. Gold also occurs in a magnetite ironstone (Sandra's Pit) striking 275°, that has abundant arsenopyrite, quartz-carbonate veinlets and grunerite. Both vein types occur in mafic metavolcanics, mainly chlorite schists.

The Maki gold occurrence may be analogous to the Homestake gold mine in the southwestern United States in that quartz veins are spatially related to a regional ironstone. The ironstone in Vincent Township was deformed and metamorphic fluids intruded the volcanic rocks producing the chalcopyrite and galena-rich post ironstone quartz-carbonate veins.

Values in the quartz-carbonate veins in the "Discovery" area range up to 0.81 ounce per ton gold and 5.89 ounces per ton silver for selected grab samples. Selected grab samples from Sandra's pit assayed up to 0.40 ounce per ton gold with a trace of silver.

Crooked Green Creek Mine (Algoma Development Company)

The Crooked Green Creek Mine occurs in Pifher Township. The Number 1 vein consists of quartz containing chalcopyrite, pyrrhotite, and gold.

A ramp, parallel to an existing old inclined shaft, has been driven normal to the vein to intersect the vein at depth, from which point vein material was worked in both directions. Three hundred and eighteen tonnes of sulphide material has been mined, manually broken and sorted, and milled at the Northern Concentrators' Mill, Thunder Bay.

Clark Occurrence

The Clark Occurrence, in Walters Township, consists of claims TB302466 and TB302709. Mapping by W.O. Mackasey (1976, p.50-52) indicated the property is underlain by metabasalt which has been intruded by quartz-feldspar porphyry dikes and a diabase dike. The

pits and trenches on the property, which for the most part are badly overgrown, are cut in quartz (carbonate) veins mineralized with arsenopyrite. The veins have various attitudes and represent a stockwork system in the basalt. The western pits in claim TB302466 are in quartz-feldspar porphyry with sulphide minerals. Assays of up to 0.12 ounce of gold per ton were obtained from selected grab samples, but spectacular wire gold has been reported in drill core (D. Thorsteinson, prospector, personal communication).

Nelson Occurrence

The Nelson Occurrence in northwestern Vincent Township on claims TB456068-9, inclusive, is underlain by mafic metavolcanics, primarily massive basalts that are locally amygdaloidal. The main showing is a sulphide ironstone comprising saccharoidal quartz interbanded with arsenopyrite and pyrite hosted by quartz-feldspar porphyry. The ironstone is a minimum of 3 m in width, and has an unknown strike length, striking 85°, dipping 78°N. The ironstone can be identified on part of a 400 m long electromagnetic conductor.

Selected grab samples from the main showing gave the following assays: 0.01 and 0.08 ounce of gold per ton, 0.15 and 0.36 ounce of silver per ton.

Warren Occurrence

The Warren Occurrence, in Walters Township, is underlain by massive to pillowed metavolcanics. A 1.2 m wide vertical shear zone striking 45°, contains quartz-carbonate vein material with chalcopyrite, pyrite, hematite, and chert. Individual veins are 2.5 to 12.5 cm wide. Old pits have been opened up by backhoe and resampled. Samples analyzed by the Geoscience Laboratories, Ontario Geological Survey, Toronto assayed up to 0.97 ounce of gold per ton and up to 0.80 ounce of silver per ton on selected sulphide-rich grab samples, and 0.01 ounce of gold per ton and 0.24 ounce of silver per ton from chip samples taken across 35.5 cm.

Tyson Mine

The Tyson Mine, in Dorothea Township, was mapped by Mackasey (1975, p.67-71).

The vertical Number 1 vein strikes 70°; was mined from an open cut in 1964. One hundred and thirty-four tonnes of ore grading over 1 ounce of gold per ton were trucked to Leitch Gold Mines Limited and MacLeod-Cockshutt Mines Limited. No work has been done since that time on the mine. The Number 1A vein ranges in width from 10 to 23 cm with some pyrite in the vein. The host rock is a massive basalt and the eastern end of the vein is truncated by a fine-grained mafic dike.

The Number 3 vein, striking 95° and dipping 75° south, is approximately 60 cm wide and has been traced by Lambie (1959) for 457 m. The vein consists of milky white quartz-carbonate carrying coarse patches of molybdenum. The reserves in 1958 were estimated to be 63 317 tonnes of material grading 2.0 percent MoS₂ over

a width of 0.9 m along a strike length of 372 m (Johnston 1968, p. 69).

The best assays obtained from selected grab samples were 0.2 ounce of gold per ton and 2.48 ounces of silver per ton.

Burrows Lake Molybdenum Prospect

The Burrows Lake Molybdenum property occurs north of Geraldton on the west shore of Burrows Lake.

The showing is hosted by massive, pink, quartz monzonite and porphyritic quartz monzonite which are part of a larger batholith. Xenoliths of an older gneissic granitoid occur in the massive monzonite, which is cut by pegmatite and aplite dikes.

Molybdenite mineralization is confined to quartz lenses and veins within (porphyritic) quartz monzonite and xenoliths of gneissic rock. Two zones have been outlined, the largest being 6 m by 60 m, both striking 60°. Molybdenite occurs as coarse flakes and small flecks in quartz veins, porphyritic monzonite, gneissic granite, and pegmatite spatially associated with the quartz. Pyrite, chalcopyrite and molybdenite also occur.

Johnston (1968, p. 73), estimated 17 780 tonnes of material containing a possible 340 829 kg of MoS₂ is present on the property, but due to the erratic nature of mineralization, hand cobbing would be necessary if material was mined from the property (D. Sinclair, Geological Survey of Canada, personal communication, September 27, 1981). In 1980, a 1 360 tonne bulk sample was mined by Graham Mining for the present owner, Dave Petrunka; 800 tonnes of this sample have been shipped to a proposed mill-site at High Lake near Kenora. The most recent exploration work was carried out by Noranda Mines Limited in 1974 (Assessment Files, Regional Mineral Resources Coordinator's Office, Thunder Bay).

Chemalloy Molybdenum Occurrence

The Chemalloy Molybdenum Occurrence in Elmhirst Township was mapped by W.O. Mackasey and Henry Wallace (1978).

The host rock is granodiorite (Elmhirst Lake Stock) with the molybdenite occurring as films and plates. Its presence may also be represented by a blue-gray colouration, in discontinuous erratic quartz veins.

Falconbridge Nickel Mines Limited diamond drilled the property in the spring of 1981 on the premise of intersecting more fractured granodiorite related to a major lineament to the north of the showing suggesting a molybdenum porphyry environment. Drill logs indicate that neither fractured granitic rocks nor good molybdenum values were encountered.

The granodiorite has been metamorphosed. The vein may not be related to the intrusion, but is likely to be a hydrothermal product. It is possible that higher than background values occur in the Elmhirst Lake Stock. Further prospecting in the area is required.

Holm Prospect

The Holm copper-gold prospect occurs in Dorothea and Sandra Townships. Massive chalcopyrite and pyrite fill numerous cleavage planes and shear zones in intermediate to felsic metavolcanics (flows and volcanoclastics). Mackasey (1975, p. 71-75) documented the four zones on the property, and the B and D zones were observed and sampled by regional geological staff. The mineralized zones are parallel east-west structures that warrant further investigation. Gold values are related to sulphide mineralization and range from trace to 0.60 ounce of gold per ton, and from trace to 2.26 ounces of silver per ton, from selected grab samples. Copper assays ranged from 0.0098 percent to 6.45 percent on the same samples.

Con Creek Prospects

Three sulphide occurrences in the Onaman River area were investigated. Property covering the ground was optioned in 1980 by Abitibi-Price Incorporated, but later dropped after a program of geophysics and diamond drilling. One of the showings (Con Creek South) is a new discovery, while the Con Creek North copper showing has been trenched. The Con Creek Abitibi showing, originally worked by Abitibi-Price Incorporated, was also visited by Ministry staff. Boulder tracing and backhoe work was responsible for the discovery. David Thorsteinson stated he has followed a carbonate zone from the Lynx-Canada property several miles to the three showings visited by the authors of this report.

The Con Creek South showing is hosted by pillowed to massive flows of basaltic to andesitic composition and consists of a zone of minimum dimensions 3 m by 18 m. Due to overburden, the exact size of the showing could not be determined. The showing is located 0.4 km west of the West Onaman Lake Batholith which has a composition ranging from quartz monzonite to granodiorite.

Greenoaks Prospect

The Greenoaks prospect is in Pifher and Elmhirst Townships. About 63.5 tonnes of ore, mined from four narrow quartz veins, were processed at the Northern Concentrators' Mill in Thunder Bay in 1981.

The property is underlain by intermediate to felsic metavolcanic flows with minor quartz-feldspar porphyry. A series of east-west quartz veins, fracture fillings, and mineralized host rock contain chalcopyrite, pyrrhotite, and gold mineralization. The quartz is blue to black and the four narrow veins worked strike 115° and dip 80° south to vertical. The widest vein is 0.6 to 0.9 m wide and has an unknown strike length. The best assay was 0.26 ounce of gold per ton and 1.54 ounces of silver per ton. A larger vein which has recently been located on the property to the northwest of the four narrow veins, is 5.0 m wide, and strikes 80° with an approximate vertical dip. Quartz is milky to smokey blue to black and is mineralized with chalcopyrite and pyrrhotite. One grab sample assayed 0.01 ounce of gold per ton and trace silver.

About 120 to 150 m east-southeast of the larger vein is an exposure of poorly mineralized quartz which may represent an extension of the same vein. A contact of quartz-feldspar porphyry with metavolcanics occurs southeast of the occurrence. One grab sample assayed trace gold and trace silver.

Greenspar Occurrence

The Greenspar Occurrence is in Pifher Township and all showings and workings that were encountered and sampled are located in claim TB604845.

The first of three showings examined is an east-west striking, 9.0 m wide, near vertical, shear zone exposed across its width by a 15.0 m trench. The geology is composed of sheared and massive intermediate to mafic metavolcanic flows. The central portion of the trenched zone is quartz injected with a local concentration of between 5 and 10 percent pyrite, pyrrhotite, and minor chalcopyrite. Six chip samples were taken across a width of 3.0 to 6.0 m, and were obtained from the east wall of the trench. One sample assayed 0.01 ounce of gold per ton and 0.93 ounce of silver per ton; two other samples indicated 0.34 ounce of silver per ton and 0.36 ounce of silver per ton. The remainder of the six samples indicated traces of gold and silver. A selected grab sample of quartz from the shear zone assayed traces of gold and silver.

A second large trench, 17 m long, striking $N20^\circ E$ is located approximately 190 m east-southeast of the first trench near the eastern boundary of claim TB604845. A quartz vein 10.2 to 25.4 cm in width, striking 70° east and dipping 67° south is hosted by a massive volcanogenic feldspar porphyry. A grab sample from the quartz vein indicates traces of gold and silver.

Another shear zone, south of the second trench and approximately 90 m north of post #2, claim TB604845 strikes 120° . The zone is highly rusted, pyritized, and occurs within the porphyritic unit. A grab sample of cherty iron formation from the zone indicates 0.01 ounce of gold per ton and 0.11 ounce of silver per ton.

Pichette Occurrence

The Pichette Occurrence is in Vincent Township. Gold mineralization occurs in: highly sheared, pillowed, and massive basalts; and highly contorted, saccharoidal, quartz veins. Shearing is predominantly east, but the veins have various attitudes. Pyrite occurs in the shear zone; pyrite and very minor chalcopyrite were noted in the veins. The best assay value obtained in the shear zone is 0.19 ounce of gold per ton and trace silver, but veins assay up to 0.56 ounce of gold per ton and 0.18 ounce of silver per ton. All assays were obtained from selected grabs. One chip sample across 71 cm of the vein where the "good" grab was taken, assays 0.16 ounce of gold per ton and trace silver. The showings have been opened up since the author's (Mason) visit and detailed channel sampling is needed.

Dikdik (Orphan) Mine

The Dikdik Mine in Rickaby Township is held by Canadian Gold Resources Incorporated. The gold mine produced 2 460 ounces of gold with an average of 0.70 ounce of gold per ton and 1 558 ounces of silver during 1934 and 1935. No work has been done in recent years on the site. A large open cut and shaft in the cut is fenced off, but some of the fence is down. Samples were taken from the vein at the contact of the Kaby Lake granodiorite and intermediate to mafic flows. The best assays were two samples of saccharoidal quartz containing pyrite and/or sphalerite. The sample with the sphalerite assayed 5.78 ounces of gold per ton and 2.94 ounces of silver per ton. The second sample assayed 3.62 ounces of gold per ton and 2.58 ounces of silver per ton.

Brookbank Prospect

The Brookbank prospect in Irwin Township has been optioned by George Chilian, Metalore Resources Limited. The property has been worked by Connell Mining and Exploration Company Limited (1934), Noranda Mines Limited (1944), and Lynx-Canada Explorations Limited (1974).

The mineralized zone consists of a pyritized and silicified carbonate unit that extends some 600 m along the contact between mafic metavolcanics and overlying metasediments. The average width of the zone is about 30 m, (Mackasey 1975, p. 49).

Chilian completed an electromagnetic (magniphase) survey and is using the results, along with the results of a magnetometer survey done by Lynx-Canada Explorations Limited, to diamond drill the anomalies in an area of sulphide-rich float, near line 23 + 00E east of the main mineralized zone. The drill program is for 3 050 m. Drilling has continued into the area of the original Noranda Mines Limited showing to the west. Two gold-bearing zones have been outlined.

The float area assayed up to 0.06 ounce of gold per ton. Assays of the main zone in Noranda Mines Limited old pits assayed from 0.01 to 0.87 ounce of gold per ton and from trace to 0.29 ounce of silver per ton.

Goldfields Occurrence

The Ternowesky-Rentz option, Summers Township, is currently being worked by Goldfields Mining Corporation Limited.

Two gold showings were observed in massive to pillowed basalts. Both showings were oxide facies ironstone, typically laminated and composed of saccharoidal quartz and magnetite. Pits were not cleaned out, but widths of 1.2 m and more were observed. Selected grab samples assayed trace to 0.01 ounce of gold per ton and trace silver.

Within the Roadside Pit, hosted in metawacke, is a composite vein made up of milky to smokey quartz carrying no sulphide minerals. The best assay, from a chip

sample, gave 0.11 ounce of gold per ton over a width of 44.5 cm.

Solomon's Pillars Prospect (Oremond Mine)

The Solomon's Pillars prospect is on the boundary between Walters and Leduc Townships. Lynx-Canada Explorations Limited holds the four claim property and was actively exploring the ground at the time of this writing.

The area is underlain by oxide facies ironstone composed of hematite, magnetite, and jasper, interbedded with wacke and slate, with quartz-calcite veins and sulphide minerals (pyrite, arsenopyrite, some chalcopyrite). The ironstone is up to 30.5 m wide, strikes 75° and dips vertically to 75° south. A 3-compartment shaft was sunk on the property in 1936-37 by Oremond Gold Mines Limited, east of which drifting on the 45.7 m and 83.8 m levels intersected gold-bearing sulphides (Randy Crowley, personal communication). Crowley stated that if sulphide minerals are not present, gold values will not occur.

The dump, 43.0 m by 15.0 m, has been resampled at 3.0 m intervals, and mapped and sampled by Lynx-Canada Explorations Limited this summer. Assay results were encouraging. This, combined with previous results of Inco Metals Company's data from which an ore zone of 91 000 tonnes grading 0.25 ounce of gold per ton was indicated, has encouraged Lynx-Canada Explorations to diamond drill the property. Plans are to drill at 8.0 m centres in the area of Inco's best hole (6.0 m ± of 0.25 ounce of gold per ton). Inco drilled at 61.0 m centres from the north, with all values obtained in the one hole.

Brenbar Mine (Goldwater Mines)

Goldwater Mines Limited hold several properties in the Beardmore-Jellicoe area including the following: Brenbar, Buffalo-Beardmore, Undersill, and Ralph Lake.

The Brenbar (Bregold) Mine produced 134 ounces of gold from 45 tons of ore during 1941 and 1949. The property is located in the northeast part of Irwin Township west of the Quebec Sturgeon River Mine. Seventeen highly erratic and lenticular quartz veins have been documented from previous mapping and drilling. The host rock is a felsic metavolcanic unit that locally comprises deformed tuff-breccia, pyroclastic breccia, and fine-grained flows and tuffs of intermediate to felsic composition, (Mackasey 1975, p. 44).

Work in 1981 included:

- 1) Mine road rehabilitation off Highway 801;
- 2) Stripping, trenching, bulk sampling of the Number 2, Number 2A, and Number 7 veins;
- 3) Screening (greater than 7.6 cm) of oversized waste dump material;
- 4) Mill testing of vein and waste material;
- 5) Dewatering of the old mine workings which consisted of a 68 m shaft with levels at 30.5 and 61 m;
- 6) Mapping and sampling of the workings by Robert Dodds Limited;

7) Construction and erection of a new two-compartment headframe and limited mill processing by a 35-ton per day portable concentrating mill on site.

The veins, which range from 1 cm to 1 m in width, are a milky, white, massive quartz with ankerite and sericite alteration. Metallic minerals present are chalcopryrite, galena, pyrite, and gold. Selected grab samples analyzed by the Geoscience Laboratory, Ontario Geological Survey, Toronto, assayed from trace to 16.88 ounces of gold per ton in heavy sulphide mineralization.

Northern Empire Mine (Pan-Empire Joint Venture)

The Northern Empire Mine in Summers Township produced 149 493 ounces of gold, 19 803 ounces of silver (1934-41, 49) averaging 0.35 ounce of gold per ton and 0.050 ounce of silver per ton. The property is being rehabilitated in a joint venture by Beardmore Gold Incorporated and Pan-Continental Mining (Canada) Limited and is known as the Pan-Empire Joint Venture. It is scheduled for production in early 1982.

A 200-ton per day mill is being constructed on site. Initially, dump material will be processed in the mill, and is estimated to be approximately 200 000 tonnes. Lower grade material may be heap leached. The tailings pond area and dams are being completed as per specifications outlined at Pan-Empire's Environmental Assessment meeting September 17, 1981. The shaft will be dewatered to facilitate sampling and mapping. The headframe will be constructed and put in place this winter.

The Northern Empire property lies in a narrow east-northeasterly trending belt of Early Precambrian metavolcanics. The main vein, the Power vein, intrudes mafic to intermediate metavolcanics. A metasedimentary-matavolcanic contact lies several hundred m to the north. The vein strikes 72° and dips 80°S, with average width of 0.60 m, and is both a single and composite vein in a 1.2—1.5 m wide shear zone. The quartz is mineralized with pyrite, arsenopyrite, pyrrhotite, minor chalcopryrite and native gold.

The Pan-Empire Joint Venture covers contiguous claims extending east through Summers, McComber, and Vincent Townships. Geophysics (air magnetometer, air VLF, air Dighem II), geochemistry and some stripping, trenching and geological mapping have been completed.

Recommendations to Prospectors

The metavolcanics in Pifher Township should be prospected and explored for copper-gold mineralization. Prospecting and exploration is recommended for gold in the felsic metavolcanic unit covering the south part of Barbara, Meader, Pifher, and Elmhirst Townships and the north portion of Sandra, Irwin, and Walters Townships. The metasediments in Eva and Summers Townships should be prospected for high grade Leitch-type gold-bearing quartz veins. Prospecting and exploration should be done in the mafic metavolcanics in Summers,

TABLE 4 | MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

Ontario Geological Survey Reports

R198 R208
R203 R214

Open File Reports

OFR 5332* OFR 5342
OFR 5333 OFR 5343*
OFR 5334* OFR 5349
OFR 5340* OFR 5351
OFR 5341 OFR 5353*

Preliminary Maps - Geological Series

P2388 P2393
P2389 P2409
P2390 P2410
P2391 P2417
P2392 P2418

Preliminary Maps - Data Series

P2132* P2149* P2155* P2161* P2167*
P2133* P2150* P2156* P2162* P2168*
P2134* P2151* P2157* P2163*
P2146* P2152* P2158* P2164*
P2147* P2153* P2159* P2165*
P2148* P2154* P2160* P2166*
Aggregate Resources Publications

Federal - Provincial Maps

Occasional Paper

7

EM-MAG Surveys

80 488 - 80 494 80 495 - 80 535

Coloured Maps

2436 2440 2452
2437 2442 5045
2439 2443 5046

Northern Ontario Engineering Geology Terrain Studies Report

NOEGTS 1* NOEGTS 42* NOEGTS 61*
NOEGTS 26* NOEGTS 54*
NOEGTS 28* NOEGTS 55*
NOEGTS 39 NOEGTS 57*
NOEGTS 41 NOEGTS 59*

Northern Ontario Engineering Terrain Studies Maps

5045* 5067* 5094*
5046* 5070* 5098*
5050* 5072* 5104*
5051* 5073*
5052* 5078*
5064* 5081*

Mineral Resources Branch Publications

12, 13

Miscellaneous Reports

77, 85, 86, 94, 95

Geological Survey of Canada Open File Reports

745
746

Study

22

*Projects funded by Ministry of Northern Affairs

McComber, and Vincent Townships and east, along strike, for ironstone and post ironstone hosted gold mineralization. Prospecting, namely boulder tracing, and exploration in the Onaman River area for lead-zinc-silver and copper-silver-gold mineralization is needed. A centrally located mill for processing small high grade ore zones is required.

Overburden sampling, namely basal and lodgement till drilling, and ground magnetometer surveys could be used in combination to locate favourable gold targets in areas of overburden, for example east of Jellicoe, due to the intricate association of gold and iron formation in the Beardmore-Geraldton metasedimentary-metavolcanic belt.

Analyzing for indicator elements, for example arsenic, is an important consideration when prospecting for gold.

Ontario Geological Survey Activities

James Inasi (Precambrian Section) mapped in the O'Sullivan Lake area (A), northwest of Geraldton.

R. H. Sutcliffe (Precambrian Section) commenced a project investigating Late Precambrian rocks of the Nipigon Plate and Early Precambrian rocks of the Wabigoon and Quetico Subprovinces in the vicinity of Lake Nipigon (B).

F.W. Breaks (Precambrian Section) completed the final phase of his investigation of rare metal pegmatites in Northwestern Ontario by spending two weeks examining the tantalum-bearing deposits at Zig-Zag Lake (C).

M.W. Carter (Precambrian Section) completed his mapping in Terrace Bay area (D).

Soussan Marmont (Mineral Deposits Section) spent one month examining the Terrace Bay Batholith (E) and assessing its potential for gold-molybdenum mineralization.

For further details on all of these projects the reader is referred to Wood *et al.* (1981).

Research by Other Organizations

Geological Survey of Canada

Activity by the Geological Survey of Canada included: the examination of selected molybdenum occurrences by W. D. Sinclair and J. M. Franklin; regional mapping by K. D. Card; and sampling of iron-bearing rocks for standard reference samples by G. Gross and Roy McLeod.

Lakehead University

A number of research projects have been completed or are in progress at Lakehead University. M. M. Kehlenbeck continued his work on the Quetico Gneiss Belt; a thesis on the structure at Dog Lake has been completed by Warren Clenndening. R. H. Mitchell and R. G. Platt continued their studies on the Coldwell Alkalic Complex; an Honours of Science Thesis by Eugene Kent was produced on this complex. Studies in Proterozoic rocks by Lakehead University students included, an Honours of Bachelor of Science Thesis on the type section of the Rosspport Formation (Cheadle 1981), and a study of the stromatolites in the Gunflint Formation at Mink Mountain by N. Spence.

Other theses completed or underway at Lakehead University include a study of the Zenith Mine by Blair Kite, and a Master of Science project by Jayne Jackson on uranium mineralization in pegmatites.

Other Institutions

A three day examination of the Gunflint Formation was made by N. J. Beukes of the Rand Afrikaans University in South Africa. This study was part of a world wide study of iron-bearing rocks.

Recommendations for Exploration

Open File Reports 745 and 746 released by the Geological Survey of Canada in January 1981, should be of special interest to all those persons who are engaged in mineral exploration and land use planning in the Lake Superior-Rainy Lake areas.

The Open File Reports are a compilation of geochemical data collected during the National Geochemical Reconnaissance-Uranium Reconnaissance Programs surveys in Northwestern Ontario during 1975-1979. In Ontario, parts of the survey were totally funded by the Ontario Geological Survey.

The method of sampling is described in these Open File Reports. The data are depicted on maps at a scale of 1:2 000 000 and show major geochemical trends. Each report contains 12 maps showing regional distribution of U, Zn, Cu, Pb, Ni, Co, Mn, Fe, Mo, Ag, As, U in water, and F. The other two maps show sample location and the pH of the lake waters.

Most of the known deposits (Geco, Lac des Iles, Burchell Lake, and so on) show up very well and these anomalies can be satisfactorily explained. However, there are other anomalies of the same order of magnitude or larger that have not been explained. These have to be investigated thoroughly. In many cases, there is a remarkable correlation between anomalies of copper, zinc, lead as well as those of copper, nickel, and cobalt. Other grouping patterns are equally discernable. Thus,

for a given area, the type of target (Cu-Zn-Pb, Cu-Ni-Co) to be expected can be defined.

In several instances, metal or element distribution has been well correlated with the regional geology. For example, the Port Coldwell Alkalic Complex is almost perfectly defined as a fluorine anomaly. Three of the four major cobalt anomalies in the Schreiber area correlate exactly with sulphide ironstone. The felsic volcanic unit southwest of Burchell Lake is outlined as a regional copper anomaly. The Lac des Iles Complex shows up as a large nickel anomaly. A regional silver anomaly in the Thunder Bay area is superposed exactly on a regional mercury anomaly, and both can probably be attributed to the Rove Formation.

A count of all major anomalies that warrant investigation reveals the following numbers: uranium anomalies, 37; copper anomalies, 30; lead anomalies, 43; nickel anomalies, 36; cobalt anomalies, 40; manganese anomalies, 41; iron anomalies, 41; molybdenum anomalies, 44; silver anomalies, 18; arsenic anomalies, 29; and mercury anomalies, 8 for a total of 400 anomalies.

If some of the larger anomalies can be explained by existing mines or known metal deposits, the unexplained anomalies may indicate similar deposits.

Copies of these Open File Reports can be examined at Resident Geologist's Office in Thunder Bay, or obtained from Campbell Reproductions, 880 Wellington Street, Ottawa, Ontario, K1R 6K7.

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Report of the Timmins Resident Geologist

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Resident and Resource Geologists' Activities

Presently, staff at the Timmins office include: W.O. Mackasey, Mineral Resources Coordinator; L.E. Luhta, Resident Geologist; P. Sangster, Resource Geologist; and K. Burke, Secretary. In addition, during the past year B. MacRae and K. Travis were employed to carry out a uranium study in the Northern Region. Diane Draper, a geology student, was hired for the summer months. Darrell Holmes was hired for the summer under the Experience '81 program.

Because of the large amount of mining and exploration activity in the area, the staff were largely involved in consultative duties. Emphasis was placed on examining properties currently under exploration and on visiting producing and developing mines. Other activities included conducting and attending geological field trips and tours, participating and organizing geological discussion group sessions, and providing geological input to municipal and Land Use Plans.

With funding received from the Ontario Ministry of Energy, a metallogenic study of uranium distribution in Northern Region has been initiated. Field work to date

TABLE 1 | MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

Ontario Geological Survey Reports

Open File Reports

OFR 5338
OFR 5339
OFR 5342
OFR 5359

Preliminary Maps - Geological Series

P. 2383
P. 2384
P. 2449

Preliminary Maps - Data Series

P. 2075
P. 2079
P. 2122
P. 2123

Aggregate Resources Publications

Federal - Provincial Maps

Coloured Maps

2440

Northern Ontario Engineering Geology Terrain Studies Report

NOEGTS 30
NOEGTS 62
NOEGTS 64

NOEGTS 74
NOEGTS 75

Northern Ontario Engineering Terrain Studies Maps

NOETS 5083
NOETS 5086
NOETS 5100
NOETS 5101
NOETS 5095
NOETS 5102

Mineral Resources Branch Publications

MPBP 12

Miscellaneous Reports

MP 85
MP 86
MP 95

Geological Survey of Canada Open File Reports

¹Resident Geologist, Timmins
²Resource Geologist, Timmins

has concentrated on the Quetico Belt and the Kapuskasing Structure.

Simultaneous with the field study and investigation of previous work, survey techniques and current research are being conducted.

An active core solicitation and collection program has resulted in the addition of samples representing in excess of 26 500 m of diamond drilling. Drill core has been donated by the following companies:

Amax of Canada Limited,
Holmer Gold Mines Limited,
Hudson Bay Mining and Smelting Company Limited,
Mattagami Lake Exploration,
Nahanni Mines Limited,
Noranda Mines Limited,
Rosario Resources Canada Limited,
Shell Canada Resources Limited,
Selco Incorporated,
Utah Mines Limited.

Although additional core is currently available for collection, insufficient space at the temporary core storage facility has resulted in limiting core collecting activities to critical situations only.

Claim Staking Activity

At the time of writing (December 1981) over 8 709 claims have been staked in the Porcupine Mining Division in 1981. This is slightly down from last year which was the most active year since the "staking rush" of 1964. The most active stakers in the Porcupine Mining Division were: Canadian Gold and Metals Limited (Chester, Benneweis, Yeo, Osway, and Marion Townships); Northgate Explorations Limited (Horwood, Silk, Fripp, and Musgrove Townships); Shell Canada Resources Limited (south of Ridge Lake); and the Canadian Nickel Company (Swayze and Denyes Townships).

In total, there are presently over 24 535 active claims in the Division compared to 18 500 at the time of working last year. This represents approximately 98 1 400 acres of land being explored, not including work done on the numerous patented mining claims in the Division and the areas granted by exploratory licenses of occupation.

Exploratory Licences of Occupation

The Cretaceous Basin is receiving much attention at the present time with four companies holding exploratory licences of occupation within the area. In 1980, Selco Mining Corporation was granted 243 000 acres and the Ontario Energy Corporation 1 050 000 acres. In 1981, Douglas Taylor Joint Venture and Lignasco Resources Limited were granted 10 400 and 92 745 acres respectively.

Operating Mines

Base Metals

The most significant development at the Kidd Creek Mines Limited (formerly Texasgulf Canada Limited) base-metal operation in Timmins was the start up of its new copper smelter and refinery complex. The smelter first began treating concentrate on June 25 with the first blister copper being produced on July 3.

Although the 1981 figures are unavailable at the time of this writing, the forecast production was scheduled to be 4.5 million tons. This is an increase from the 4 298 600 tons milled in 1980, from which the operation produced 112 000 tons of zinc metal, 68 000 tons of copper metal, a total of 7 095 200 ounces of silver, 1 954 900 pounds of cadmium, 220 581 pounds of tin and 30 600 tons of lead concentrates.

The bulk of the production came from the 800- and 1200-foot levels with some ore being mined from the 1600-foot level.

In 1981, development footage at the Number 1 mine was 23 840 feet and 32 760 feet at the Number 2 mine. This compares with the 1980 figures of 19 000 feet and 27 500 feet respectively. Total underground diamond drill footage was 82 000 feet of which 18 300 was classified as exploratory drilling. This compares with the 1980 figures of 74 000 and 28 000 feet respectively. Surface diamond drilling at the minesite amounted to a total of 7 757 feet. It is expected that in 1982 that production at the Number 2 mine will be at capacity.

Total employment by Kidd Creek Mines Limited in mining and metallurgy increased from the 1980 total of 2540 to 3008 people in 1981 (Kidd Creek Mines Limited personal communication).

Precious Metals

Even with the price of gold taking a downturn in 1981, Dome Mines Limited is continuing ahead with a \$92 million expansion, scheduled to be completed in the fall of 1984. This includes a new 5 400-foot shaft from surface (Number 8 shaft) with associated facilities plus rehabilitating and expanding the mill to increase throughput from 2000 to 3000 tons per day. In 1980, the company produced 678 100 tons at an average grade of 0.132 ounce Au per ton from which 85 873 ounces of gold were recovered. The 1981 production figures are unavailable at the time of this writing, however, similar results are expected. All 1981 production came from stopes above the 25th level (3550 feet below surface). The number 7 shaft was dewatered, and drifting on the 34th and 37th level is being done to the projected location of the new number 8 shaft.

A total of 18 883 feet of development was done to 1981 compared to 17 200 feet in 1980.

Diamond-drill footage totalled 38 456 feet compared to 61 700 feet in 1980. Of this, 4 940 feet was

exploration drilling in the 7 shaft area, 4050 feet was diamond drilling for Augdome Corporation Limited from Dome ground, and 29 466 feet was done for ore definition and mine development.

Presently there are 741 people employed by Dome Mines Limited at its South Porcupine operation, up from 680 a year ago (Dome Mines Limited, personal communication).

The most significant project started by Pamour Porcupine Mines Limited in 1981 was the beginning of development of the underground workings at the Timmins property (the former Hollinger gold mine). A potential of 2.1 million tons of gold ore at an average grade of 0.12 ounce Au per ton exists, and the company decided to appropriate \$15 million for the erection of a mining plant and to rehabilitate the old Main Shaft in order to proceed with development so that production can begin by July 1, 1982.

Production on the Hoyle property adjacent to Pamour Porcupine Mines Limited #1, and owned by Falconbridge Nickel, was stopped early in 1981 by Pamour Porcupine Mines Limited due to low gold grades.

At the time of this writing the 1981 production figures are unavailable; however, it is expected that Pamour Porcupine Mines Limited will mine approximately 1 750 000 tons at an average grade of 0.07 ounce of gold per ton and 0.12 percent copper from all of their operations which feed the two 3000 tons per day capacity mills located at the Schumacher Division (formerly the McIntyre Mine) and at the Pamour Number 1 minesite.

This will be slightly below the production attained in 1980 which was 1 826 080 tons at 0.074 ounce Au per ton and 0.118 percent copper. An approximate breakdown for the 1981 production is given below.

Schumacher Division: (underground) 550 000 tons (which includes over 4000 tons obtained from open pit mining on the Westfield property),
Ross Division: (underground) 213 000 tons,
Timmins Property: (underground) 33 000 tons,
Romfield: (open pit) 45 000 tons,
Canadian Arrow: (open pit) 157 000 tons,
Matachewan: (open pit) 35 000 tons,
Pamour #1: (underground) 573 000 tons,
Pamour #2: (underground) 46 000 tons,
Pamour #3: (underground) 85 000 tons,
Hoyle: (underground) 4 600 tons.

A total of 123 355 feet of underground diamond drilling has been done by Pamour Porcupine Mines Limited, mostly at the Ross Mine, Pamour No. 1, Timmins Property, and the Schumacher Division. A total of 14 044 feet of surface diamond drilling supervised by the mine geology staff was done at the Canadian Arrow property, Pamour No. 1 and the Westfield property adjacent to the Schumacher Division Mine.

The exploration department did a geophysical program on the company's claims in Macklem and Cody

Townships, supervised percussion and diamond drilling on Gold Island in Cody Township, and supervised a diamond-drill exploration program in the Aunor, Delnite, Romfield area in Deloro Township.

At present, there are 1270 people employed by Pamour Porcupine Mines Limited which is approximately the same number as last year (Pamour Porcupine Mines Limited, personal communication).

The Joburke Mine in Keith Township, 80 percent owned by Noranda Exploration Limited and 20 percent by Cenex Limited closed in October 1981. The mining was contracted to the Mining Corporation of South Porcupine with the milling being done by Pamour Porcupine Mines Limited. Between September 1973 and December 1975 and between 1979 and October 1981 when the mine was re-opened, a total of approximately 450 000 tons with an average grade of 0.10 ounce Au per ton was produced. The gold grade was decreasing at depth and exploration drilling below the 500-foot level failed to intersect better gold grades (Mining Corporation personal communication).

Ore from the Owl Creek gold deposit, jointly owned by Kidd Creek Mines Limited (the operator) and Inco Limited (the discoverer), started to be produced by open pit mining methods in November, 1981. The Open Pit is located at the west end of the deposit and 1 million tons are expected to be mined by open pit methods at a production rate of 200 000 tons per year. Ore presently being mined (at the time of this writing, December 1981) is being stockpiled and will be put through Kidd Creek's mill in Hoyle Township starting in January 1982. Underground development is still proceeding for evaluation and exploration purposes (Kidd Creek Mines Limited, personal communication, 1981).

Industrial Minerals

Steeley Talc Limited mines and beneficiates talc-magnesite ore in Penhorwood Township and ships the material to Timmins for fine grinding and packaging. In 1981, 90 000 tons were mined, of which 54 000 tons were consumed in the production of 15 000 tons of concentrate. This represents an 82 percent production increase over 1980. The total absence of asbestos and the extremely low abrasion characteristic of this finely ground talc has aided in its acceptance in a wide range of applications within the pulp and paper, paint, plastics, and cosmetic industries. Steeley Talc Limited presently employs 39 people at its Timmins operations (Steeley Talc Limited, personal communication, 1981).

Property Evaluation and Development Projects

The biggest news in the Timmins Resident Geologist's area was the announcement made early in 1981 that Amoco Canada Petroleum Company Limited, Campbell Red Lake Mines Limited, and Dome Mines Limited will

bring into production in October 1983 a gold deposit in the Detour Lake area. Ore reserves at the Detour Lake joint venture site are reported to be 20 million tons at an average grade of 0.125 Au per ton. This grade is down to the 1800-foot level. Initial production will be by open pit methods at a daily rate of 2000 tons per day with underground production scheduled to begin in 1987 with mill capacity increased to 4000 tons per day. To date, accommodation facilities have been constructed, footings for the mill and plant almost completed, and the road and power line to the property has been started. Diamond drilling for ore definition purposes in the open pit area and exploration drilling at the west end was done in 1981 (Campbell Red Lake Mines Limited, personal communication, 1981).

Quebec Sturgeon River Mines Limited completed shaft sinking to a depth of 270 feet, and 1300 feet of lateral development on the 200-foot level in September 1981 on their Stock Township gold property. A total footage of 15 000 feet of diamond drilling has just been completed at the time of this writing (December 1981). Although up-dated reserve figures have not been calculated or published, it is reported that drilling results were very encouraging. Further development which would include deepening the shaft to 600 feet and establishing two more levels is planned, pending financing (Quebec Sturgeon River Mines Limited, personal communication, 1981).

Asarco Exploration Company of Canada Limited has started a \$7 million dollar underground development program to evaluate its gold deposit in Macklem Township which was discovered in 1980. The shaft is to be sunk to 570 feet. A horizontal development of 3000 feet and 15 000 feet of underground diamond drilling are planned. The company is also continuing exploration in the vicinity of the deposit (Asarco Exploration of Canada Limited, personal communication).

Diepdaume Mines Limited have completed rehabilitating the surface plant and constructing a headframe over the shaft on the old Preston East Dome gold mine in Tisdale Township. Dewatering has been completed to the 5th level (550 feet below surface). Six short exploratory surface diamond drill holes were drilled on the property in 1981 (Diepdaume Mines Limited, personal communication).

Bridgeview Resources, a private company, constructed a headframe and dewatered the old Jerome Gold Mine in Osway Township to the first level. A sampling program was carried out, and 2700 feet of surface diamond drilling was completed. Work was stopped due to a dispute with a contractor and the drop in the price of gold (Northern Miner, August 16/81 Bridgeview Resources, personal communication).

After drilling a total of over 64 000 feet in two years (29 357 feet in 1981) Northgate has indicated gold reserves of approximately 1 million tons at an average grade of 0.18 ounce Au per ton on the Consolidated Orofino property in Silk and Horwood Townships. A decision to go underground is to be made next (Northgate, personal communication).

Nickel Offsets are considering shaft sinking and underground development on their gold deposit in Tully Township. Drilling in 1981 (totalling 10 000 feet) added to the reserves established during the 1980 program. In July the company reported a reserve figure of 650 000 tons at an average grade of 0.17 oz. Au per ton. The company later reported that the original zones have been extended and these indicated reserves will be increased. A new deeper zone was also discovered (Northern Miner, July 23/81, Nov.5/81).

Kidd Creek Mines Limited (formerly Texasgulf) have completed approximately 10 000 feet of surface diamond drilling on its Hoyle Pond gold deposit discovered in 1980. Sections are presently being drawn up and interpreted (at the time of this writing, Dec. 1981) with reserve calculations to be done in early 1982 (Kidd Creek Mines Ltd., personal communication).

J.V. Bonhomme completed a 25 000 foot drilling program started in 1980, in February 1981, to re-evaluate the old DeSantis Gold Mine in Ogden Township. No decision has been made on the next stage of re-evaluation (J.V. Bonhomme, personal communication).

M.W. Resources Limited reported reserves of 80 000 tons grading 3.9 percent copper and 6.2 percent zinc after a drilling program this summer on its deposit in Cunningham Township. The company plans to do more drilling next year. A decision is to be made then whether to have a custom milling operation or to continue exploration to determine if the property can support a mill (Northern Miner, December 10, 1981).

Murgold Resources Limited did a total of 230 feet of underground development on the old Strathmore property in Chester Township. A new headframe was constructed over the old shaft and the only level (approximately 100 feet below surface) was advanced 140 feet westward to 240 feet and 90 feet eastward to 180 feet. Backs were taken down and a total of 700 tons of material were hoisted and stockpiled. Plans for 1982 are to test mill this material, do a surface drill program ahead of the drifting, and drill other veins in the area. If results are positive, a new shaft and underground development may be considered (Murgold Resources, personal communication).

Sulpetro Minerals Limited optioned the Rundle Gold property in Newton Township from Hollinger Argus in 1981. A mapping project and geophysical surveys were conducted over the property during the summer. A road is presently being constructed southward to the property off the road to the Orofino gold deposit in Silk Township (Sulpetro Minerals Limited personal communication).

Gowganda Silver Mines Limited began to open pit the gold-bearing iron formation on the old Carshaw-Porcupine property in Shaw Township. The existing dump, consisting of material from previous underground development, has been sampled and encouraging results were obtained. A percussion drill sampling program has been carried out. At the time of writing (December 1981) negotiations are in progress with regard to custom milling (Northern Miner, December 10/81; Timmins Daily Press, December 22/81).

Abitibi Price Incorporated continued drilling on its Lucas Township gold deposit found by the company in 1980. No information on this year's results have been released at the time of this writing (December 1981).

Brown McDade Mines Limited intersected gold and silver values in drilling on its property in Denton Township. J-Dex Mining and Exploration Limited has been doing the exploratory work. It is reported that a 200-ton bulk sample will be removed and that preliminary steps to carry out a small scale mining operation will be taken. (Northern Miner, October 1/81).

Intex Mining Company Limited and Frankfield Explorations Limited have diamond drilled their two gold zones in Tully Township. The west (Texmont) zone is reported to have a 600-foot strike length, a true width of 12 feet and a grade averaging 0.20 ounce Au per ton. Diamond drilling was also done on the east (Frankfield) zone; however, no results are available. The next stage of evaluation would be to obtain a bulk sample which would

require the construction of an access road to the property (Northern Miner, July 16/81).

Go-West Gold Resources Limited stripped and carried out a surface sampling program, then drilled 6000 feet at the old Halpenny gold property in Denton Township. Results are not available at the time of this writing (December 1981).

Augdome Corporation Limited continued drilling its gold prospect in Tisdale Township in 1981 from both surface and from the underground workings of the Dome Mine (Northern Miner, October 8/81).

Drilling continued in 1981 to evaluate the Bell Creek Zone on Broulan Reef Mines' claims in Hoyle Township. The work is being done by Rosario Resources Canada and DuPont of Canada Explorations under option agreement. Gold intersections have been reported but no reserve figures have as yet been published. Other targets in the area have been drilled by Rosario and Dupont (Northern Miner, April 30/81).

TABLE 2

EXPLORATION ACTIVITY DURING THE YEAR.

Number on Figure	Individual or Company	Activity
1.	Abitibi Price Inc.	diamond drilling in Tully and Prosser Twps.
2.	R. Allerston Property	diamond drilling in Whitney Twp.
3.	Amex Minerals Exploratiøn	geological survey in Shaw Twp.
4.	L. Armstrong	trenching and stripping in Walls Twp.
5.	J. Arsenaull	trenching in Slack Twp.
6.	R. Arsenaull	trenching in Slack Twp.
7.	Augdome	diamond drilling in Tisdale Twp.
8.	J. V. Bonhomme	diamond drilling in Matheson Twp.
9.	Brown McDade Ms. Ltd.	stripping, trenching and diamond drilling in Denton Twp.
10.	M. L. Burton	manual labour in Esther Twp.
11.	H. D. Carlson	diamond drilling in Ogden Twp.
12.	Chester Resources Ltd.	extensive stripping, trenching and also diamond drilling in Chester Twp.
13.	Dawson Eldorado Mines Ltd.	VLF surveying in Hoyle Twp.
14.	Dome Exploration Ltd.	EM and Mag surveys in West of Sunday Lake and Sunday Lake Area.
15.	Gold Shield Syndicate	diamond drilling in West Sunday Lake and Hopper Lake Area.
16.	Granges Exploration AB	diamond drilling in Tooms and Greenlaw Twps.
17.	Gulf Minerals Canada Ltd.	diamond drilling in Geary, Mahaffy and Thorburn Twps.
18.	Hollinger Argus Ltd.	diamond drilling in Shaw Twp.
19.	Ingamar Explorations Ltd.	VLF, Mag, EM surveying in West Sunday Lake Area.
20.	Intex	diamond drilling in Tully Twp.
21.	V. Killeen	manual labour in Hassard Twp.
22.	L. Lytle	diamond drilling in Chester Twp.
23.	Mattagami Lake Exploration Co. Ltd.	diamond drilling in Hurdman & Alexandra Twps. Mag and HLEM surveys in Carnegie Twp.
24.	Nahanni Mines Ltd.	diamond drilling in Ottaway and Stock Twps.
25.	Nickel Offsets Ltd.	diamond drilling in Tully Twp.
26.	Norcen Energy Resources Ltd.	diamond drilling, Mag and EM surveys in Jamieson, Jessop, Little and Macdiarmid Twps.
27.	Omab Enterprises Ltd.	diamond drilling in Detour Lake Area.

TABLE 2 Continued

Number on Figure	Individual or Company	Activity
28.	Orofino Mines Ltd. (Northgate Opt.)	Mag, geological and aerial photography surveys in Silk Twp.
29.	Pamour Porcupine Mines Ltd.	Mag and VLF surveys in Cody and Thomas Twps., diamond drilling in Macklem Twp.
30.	Placer Development Ltd.	overburden drilling in Deloro Twp.
31.	Preussag Canada Ltd.	diamond drilling in Bristol Twp.
32.	D. R. Pyke	overburden drilling in Carman, Cody, Macklem and Mountjoy Twps.
33.	J. Reed	manual labour in Whitesides Twp.
34.	Renabie Mines Ltd.	VLF surveys in Brackin Twp.
35.	Rio Alto Exploration Co. Ltd.	VLF surveys in Hoyle Twp.
36.	Rosario Resources Canada Ltd.	diamond drilling in Whitney, Hoyle & Mahaffy Twp. - IP surveys in Carnegie Twp.
37.	Rosario Resources Canada Ltd. & Utah Mines Ltd.	overburden drilling in Mahaffy Twp.
38.	J. St. Gelais	manual labour in Deloro Twp.
39.	Selco Inc.	mag. surveys and/or diamond drilling in Birdsall, Brain, Haight, Hamlet and Heath Twps. and in the following Areas: Byrnes Lake, Crawford Lake, Fox River, North Fox River, Killick Lake, South Killick Lake, Kenogami R., Kabinakagami R., Little Drowning River, Trilsbeck Lake, Ridge Lake and South Ridge Lake.
40.	Wm. Sims Industries Ltd.	stripping, Mag and EM surveys in Chester Twp.
41.	Surveymin Ltd.	diamond drilling in Stock & Clergue Twps.
42.	Teck Exploration Ltd.	diamond drilling Montcalm Twp.
43.	Texasgulf Canada Ltd.	AMag, AEM surveys for Bristol, Carscallen, Denton & Thorneloe, diamond drilling in Godfrey, Bristol, Carscallen.
44.	R. Tremblay	manual labour in Penhorwood Twp.
45.	Western Mines Ltd.	overburden drilling in Lower Detour Lake and Sunday Lake Areas.
46.	B. Whitmarsh	manual labour in McArthur Township.
47.	Wilkinson Mining and Exploration Co. Ltd.	VLF surveys in Brebeuf Twp.

Exploration Activity

Exploration activity during 1981 in the Timmins resident geologist's area was extremely high. As last year, even though the price of gold fell, emphasis was placed on the exploration for gold deposits. Generally, the smaller companies explored for gold, while the larger companies carried out exploration for both gold and base metals. Described briefly are some of the projects carried out in the area for 1981.

Base-Metal Exploration

One of the most active companies in base metal exploration was Kidd Creek Mines Limited (formerly Texasgulf Incorporated). The company drilled 24 000 feet in 1981 in Carnegie Township, mostly on the property of Chance Mining and Exploration Limited. Kidd Creek Mines Limited terminated the option in June 1981. A total of 16 000 feet was drilled by the company in Kidd, Godfrey, Robb, and Wark Townships (Kidd Creek Mines Limited, personal communication).

Gulf Minerals Limited also had an aggressive base-metal exploration program. The company drilled 28 holes (13 600 feet) in Geary, Thorburn, Mahaffy, Reid, and Loveland Townships. Although no economic mineralization was intersected, the geology is reported to be interesting. The company is holding its properties and after evaluating the information, will plan further drilling

in 1982 (Gulf Minerals Limited, personal communication).

Mattagami Lake Exploration continued its 1980 program of drilling in Alexandra and Hurdman Townships with 32 holes (30 727 ft.) being drilled in 1981. Low zinc and silver values were obtained. No further work is planned in the near future (Mattagami Lake Exploration, personal communication).

Hudson Bay Exploration and Development Limited drilled geophysical anomalies in the Hornepayne area. Nothing of economic significance was found. The company also drilled geophysical targets in Mahaffy, Geary and Prosser Townships (Hudson Bay Exploration and Development Limited, personal communication).

Utah Mines Limited applied for lease status for their Redstone nickel deposit in central Eldorado Township. Four diamond-drill holes were drilled in Langmuir Township by the company in search of other nickel deposits. Negative results were obtained. Utah Mines Limited also carried out an overburden drilling program in Reid Township (Utah Mines Limited, personal communication).

Amax of Canada Limited drilled geophysical anomalies in Walls and Minnipuka Townships (Amax, personal communication).

Noranda Exploration completed ground geophysics on 10 grids in Douglas, Fasken and Fallon Townships. (Noranda Exploration, personal communication).

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Adams Twp.	42A/6	Amax Minerals Expl. Ltd.	-	Assess.	GL	1980	2.3797-2.3801	T-1978
Alexandra Twp.	42H/5NW	Mattagami Lake Expl. Co.Ltd.	-	"	DD-1-387 ft., HLEM, Mag. DD-3-1006 ft.	1979 1980 1981	2.3395- 2.3398	T-1983, T-2316
Arbutus Twp.	410/9, 41P/12	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3559	T-2357
Avon Twp.	42H/13SE	L.Lefebvre Prop.	Base Metals	"	Manual labour	1980	-	T-2340
Bartlett Twp.	42A/3	Bagdad Expl.Assoc. Ltd.	-	"	GC	1979	2.3321	T-2364
Benneweiss Twp.	410/9,41P/ 12	Canadian Gold & Metals Inc.	Au	"	AMag, AEM	1980	2.3559	T-2357
	41P/12SW	Hargor Resources Inc.(Wm.Sims Industries Ltd.)	Au	"	Mag,VLF,sTr	1980	2.3048, 2.3432	T-1947
Birdsall Twp.	42I/13	Selco Inc.	diamonds	"	Mag	1981	2.3877	T-2373
Brackin Twp.	42B/5SW	Renabie Mines Ltd.	Au	"	EM, VLF	1981	2.3891	T-2370
Brain Twp.	42I/13	Selco Inc.	diamonds	"	Mag	1981	2.3877	T-2373
Brebeuf Twp.	41P/5SE	Wilkinson Mining & Exploration	-	"	VLF	1981	2.3917	T-2380
Bristol Twp.	42A/5	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3752	T-2366
	42A/5SE	J.Croxall & D.Miller Property	Au	"	mech.equip,sTr	1980	2.3171	T-1950
	42A/5NE	Texasgulf Canada Ltd.	Au	"	Mag	1979, 1980 1981	2.3300 2.3888	T-1998 T-1941
				"	AEM,AMag			
Byrnes Lake Area	42J/5SE	Selco Inc.	diamonds	"	Mag, DD-2-191.3 m, Mag	1980 1981	2.3878 2.3729	T-2319 T-2350 T-2319
Calvert Twp.	42A/10NE	Amax Minerals Expl. Ltd.	Ag, Au	"	AMag	1980	2.3757	T-2356
Cargill Twp.	42G/7SW	Sherritt Gordon Opt.	phosphate	"	BH-17-775m, GL	1980 1981	2.3933	T-1731
Carman Twp.	42A/6	Amax Minerals Expl. Ltd.	-	"	GL	1980	2.3797- 2.3801	T-1978
	42A/7NW	D.R. Pyke Property	-	"	OVD-12-829 ft.	1981	2.4067	T-2369
Carnegie Twp.	42A/14SW	Abitibi Price	-	"	DD-3-2512 ft., HLEM, Mag	1980	2.3631	T-2317
		Rosario Resources Canada Ltd.	-	"	HLEM, Mag IP	1980 1981	2.3696 2.3695	T-2336 T-2336
	42A/14SW	Mattagami Lake Expl. Co.Ltd.	-	"	HLEM, Mag	1981	2.3822	T-2353
	42A/11NW	Texasgulf Canada Ltd	-	"	OVD-4-312 ft., AEM, AMag	1980	2.3759	T-1869, T-1872
Casselmann Twp.	42G/1SW	J.G.Ouellette Prop.	-	"	rTr,manual labour	1980	-	T-2334
Carscallen Twp.	42A/5NE	Texasgulf Canada Ltd	Au	"	AMag, AEM	1981	2.3888	T-1941
	42A/5NE	Canadian Gold & Metals Inc.	Au	"	AMag, AEM	1980	2.3752	T-2366
Champagne Twp.	410/9,41P/ 12	Canadian Gold & Metals Inc.	Au	"	AMag, AEM, Mag	1980	2.3559	T-2357

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TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Chester Twp.	41P/12SW	Wm.Sims Industries Ltd.	Au	Assess.	EM, Mag, sTr	1980-1	2.3042 2.3048	T-1947
	41P/12SW	Chester Resources Inc.	Au	"	rTr, sTr	1981	-	T-2355
	"	L.K.Lytle Property	Au	"	DD-8-423 ft.	1981	-	T-1934 T-1969
	410/9, 41P/12	Canadian Gold & Metals Inc.	Au	"	AMag, AEM, Mag	1980	2.3559	T-2357
Clergue Twp.	42A/10SE	Surveymin Ltd.	Au	"	Mag, HLEM, DD-1-1027 ft.	1980-1	2.3554	T-2330
	42A/10NE	Amax Minerals Expl. Co. Ltd.	Au	"	AMag	1980	2.3757	T-2356
Cody Twp.	42A/6	Amax Minerals Expl. Co. Ltd.	Au	"	GL	1980	2.3797- 2.3801	T-1978
	42A/10SE	D. R. Pyke Property	Au	"	OVD-40-1604 ft.	1981	2.4036	T-2375
	42A/10SW	D. R. Pyke Property	Au	"	OVD-30-2020 ft.	1981	-	T-2374
	42A/11SE	Texasgulf Canada Ltd	Au	"	Mag, OVD-31-2681 ft.	1980	2.3458 2.3552	T-1990
	42A/10SW	Pamour Porcupine Mines Ltd.	Au	"	Mag	1981	2.3834	T-1573
Crawford Lake Area	42J/11	Selco Inc.	diamonds	"	Mag	1981	-	T-2376
Cummings Twp.	42G/7SW	Sherritt Gordon Opt	phosphate	"	BH-17-775 m, GL	1980	2.3933	T-1731
Cunningham Twp.	410/10NE	Placer Development Ltd.	-	"	Mag, HLEM, GC DD-4-1250 ft.	1979 1980	2.3452	T-2050
Deloro Twp.	42A/6	Amax Minerals Expl. Co. Ltd.	Au	"	GL, DD-5-958 ft.	1980	2.3797- 2.3801	T-1978
	42A/6NW	J.St.Gelais Prop.	Au	"	manual labour, mech.equip.	1981	-	T-2351
	42A/6NW	Placer Development Ltd.	Au	"	OVD-23-1254 ft.	1981	2.4191	T-2382
Dent Lake Area	42J/12SE	Selco Inc.	diamonds	"	DD-1-153.2m	1980	-	T-2346
Denton Twp.	42A/5SE	Canadian Nickel Co. Ltd.	Au	not assess.	DD-1-367.0 ft.	1981	-	T-1834
		Brown McDade Mines Ltd.	Au	Assess.	rTr, sTr, DD-8-422.5 ft.	1980 1981	-	T-1991
	42A/5,6	Texasgulf Canada Ltd	Au	"	AMag, AEM	1981	2.3888	T-1941
Doyle Twp.	42A/4NE	R. Dubeau Property	-	"	manual labour	1980	-	T-2352
Dublin Twp.	41P/3,4	Rio Tinto Canadian Expl.Ltd.	-	"	DD-12-1342m	1980	2.3521	T-1927
East of Squirrel River Area	42J/5SW	Selco Inc.	diamonds	"	DD-1-100 ft.	1980	-	T-2348
Ecclestone Twp.	42G/7SW	Sherritt Gordon Opt	phosphate	"	BH-17-775 ft. GL	1980 1981	2.3933	T-1731
Eldorado Twp.	42A/6	Amax Minerals Expl. Ltd.	-	"	GL	1980	2.3797- 2.3801	T-1978
Esther Twp.	410/9, 41P/12,	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3359	T-2357
	410/9W	M.L.Burton Property	-	"	manual labour	1981	-	T-1920
Evelyn Twp.	42A/10, 11	Rosario Resources Canada Ltd.	-	"	DD-11-5629 ft.	1980	-	T-1946
Fallon Twp.	42A/3, 6, 7	R.J.Wright Property	-	"	DD-3-980 ft.	1980	-	T-1995
Fingal Twp.	410/9, 41P/12	Canadian Gold & Metals Inc.	Au	"	AMag, AEM	1980	2.3359	T-2357
Foley Twp.	42B/2, 7, 8	R. Dubeau Property	-	"	rTr	1980	-	T-2377
Fox River Area	42J, K	Selco Inc.	diamonds	"	Mag	1981	2.3878	T-2379
Geary Twp.	42A/12, 13, 14	Gulf Minerals Canada Ltd.	-	"	DD-6-724.5 ft. DD-5-2231 ft.	1981 1981	- -	T-1929 T-2367

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
German Twp.	42A/10SW	Asarco Exploration Co. of Can. Ltd.	Au	Assess.	OVD-5-1083 ft.	1980	2.3510, 2.3263, 2.3092	T-1959
					Mag.	1980	2.3486	T-1959
	42A/10SW	D. R. Pyke Prop.	Au	"	GC	1980	2.3899	T-2365
Godfrey Twp.	42A	Norcen Energy Resources Ltd.	B.M.	"	Mag, EM	1980	2.3337	T-1966
					DD-2-1430 ft.	1981	-	T-1867
	42A/5	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3752	T-2366
Greenlaw Twp.	410/10W	Granges Expl AB	BM,Ag	"	DD-5-1082 ft.	1981	-	T-1940
Groves Twp.	410/9,41P/12	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3559	T-2357
					DD-3- 771 ft.	1980	-	T-1940
Hassard Twp.	42A/4SE	V.Killeen Property	-	"	manual labour	1981	-	T-1937
Haight Twp.	42I/13	Selco Inc.	diamonds	"	Mag	1981	2.3877	T-2373
Hamlet Twp.	42I	Selco Inc.	diamonds	"	Mag	1981	2.3877	T-2371
Heath Twp.	42I	Selco Inc.	diamonds	"	Mag	1981	2.3877	T-2371
Heenan Twp.	410/16SW	Falconbridge Nickel Mines Ltd.	-	"	sTr, EM	1980	2.3744	T-2345
Horwood Twp.	42B/1SW	M. Terrell Property	-	"	sTr, rTr	1980	-	T-2322
					GL, EM, Mag,Air photos	1980, 1981	2.3568	T-2126
Hoyle Twp.	42A/11	Rosario Resources Canada Ltd.	Au	"	OVD-29-1782 ft. DD-5-2491 ft. DD-2-614 ft.	1978, 1979 1981	-	T-1928
					VLF	1981	2.3851	T-2360
					VLF	1981	2.3864	T-2370
Hopper Lake Area	32E,L	Western Mines Ltd.	Au	"	AEM	1980	2.3651	T-2331
					DD-12-3836 ft.	1981	-	T-1924
Huffman Twp.	410/9,41P/12	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3559	T-2357
Hurdman Twp.	42H/12	Mattagami Lake Expl. Co. Ltd.	-	"	DD-6-2783 ft. Mag, HLEM DD-9-3224 ft.	1979 1980 1981	2.3308 2.3399 2.3872	T-1972 T-1972 "
					HLEM	1980	2.3547	T-1936
					HLEM, Mag,AMag, AEM, GL DD-1-148.4 m.	1980 1981	2.3305, 2.3391, 2.3391, 2.3030, 2.3564, 2.3337, 2.3344	T-1966
Jessop Twp.	42A	Norcen Energy Resources Ltd.	BM	"	HLEM, Mag,AMag, AEM, GL	1980 1981	2.3305, 2.3391, 2.3030, 2.3564, 2.3337, 2.3344	T-1966
					HLEM	1980	2.3379	T-2314
					manual labour	1981	-	T-1882
Kabinakagami River Area	42J,K	Selco Inc.	diamonds	"	Mag	1981	2.3878	T-2379
Kenogami River Area	42J,K	Selco Inc.	diamonds	"	Mag	1981	2.3878	T-2379

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TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Keith Twp.	42B/11 NW	Dome Exploration Canada Ltd.	-	Assess.	Mag	1980	2.3737	T-2338
Kenogaming Twp.	42A/4NW	Texasgulf Canada Ltd	-	"	Mag,HLEM,VLF	1979, 1980	2.3324	T-2000
Killick Lake Area	42J/6, 42K/11,15	Selco Inc.	diamonds	"	Mag	1981	2.3886	T-2379
Langmuir Twp.	42A/6	Amex Minerals Expl. Ltd.	-	"	GL	1980	2.3797-2.3801	T-1978
Lemoine Twp.	42B/2,7,8	R. Dubeau Property	-	"	rTr	1980	-	T-2377
Little Twp.	42A/NW	Norcen Energy Resources Ltd.	BM	"	Mag,HLEM,GL	1979, 1980, 1981	2.3564, 2.3314, 2.3959, 2.3334, 2.3333	T-1966
	42A/10,11	Rosario Resources Canada Ltd.	-	"	DD-11-5629 ft.	1980	-	T-1946
Little Drowning River Area	42J/6, 42K/11,15	Selco Inc.	diamonds	"	Mag	1981	2.3886	T-2368
Lizar Twp.	42C	Sveinson-Way Mineral Services Ltd.	-	not assess.	DD-18-4265 ft.	1980	-	T-1964
Loveland Twp.	42A/12,13, 14	Gulf Minerals Canada Ltd.	-	assess.	DD-19-9517 ft.	1980	-	T-1929
Lower Detour Lake Area	32E,L	Western Mines Ltd.	Au	"	AEM,OVD-5-562	1980, 1981	2.3651, 2.3876	T-2331
Macdiarmid Twp.	42A/NW	Norcen Energy Resources Ltd.	BM	"	Mag,HLEM,AEM, GL,DD-1-172.5m	1979, 1980, 1981	2.3337, 2.3564, 2.3790	T-1966
	42A/11NW	Texasgulf Canada Ltd	-	"	OVD-17-1828 ft. AMag, AEM	1980	2.3759	T-1869
Macklem Twp.	42A/10SW	Pamour Porcupine Mines Ltd.	Au	"	Mag,DD-2-766 ft.	1980, 1981	2.3514	T-2313
	42A/10SW	D. R. Pyke Property	Au	"	OVD-56-2523 ft.	1981	2.4036, 2.4038	T-2375, T-2358
Mahaffy Twp.	42A/13SE	Rosario Resources Can.Ltd. & Utah Ms. Ltd.	Au	"	Mag,HLEM,OVD-23-2312 ft.	1979, 1981	2.3441-2.3929	T-1841
	42A/12,13, 14	Gulf Minerals Canada Ltd.	-	"	DD-25-1676m	1980, 1981	-	T-1929
Mallard Twp.	410/9NW	AIM Inc.	-	"	Mag,EM,Res.,GL, rTr	1980	2.3571	T-2318
	410/9,41P/ 12	Canadian Gold & Metals Inc.	-	"	AMag, AEM	1980	2.3359	T-2357
Marion Twp.	410/16SW	Falconbridge Nickel Mines Ltd.	-	"	sTr, VLF	1980	2.3744	T-2345
Matheson Twp.	42A/11SE,	Texasgulf Canada Ltd	-	"	OVD-7-153 ft.	1980	2.3485	T-1984
	42A/10SW	J.V.Bonhomme Prop.	-	"	DD-2-1494 ft.	1981	-	T-261
	42A/11SE	D.Meunier Prop.	-	"	rTr,mech.equip.	1980	-	T-1734
McArthur Twp.	42A/3E	B.Whitmarsh Prop.	-	"	manual labour	1981	-	T-616
	42A/3	Bagdad Expl.Assoc. Ltd.	-	"	GC	1979	2.3321	T-2364
McCart Twp.	42A/15SW	Surveymin Ltd.	-	"	Mag, VLF	1980	2.3570	T-2324
McPhail Twp.	410/NE	N.Ruttan Property	-	"	rTr	1980	-	T-2333
Minnipuka Twp.	42B/13	Amex Minerals Expl. Ltd.	-	"	DD-12-1182m	1980	2.3283	T-1961
Montcalm Twp.	42B/9SE	Teck Exploration Ltd	-	"	DD-4-574m	1981	-	T-1835
Mountjoy Twp.	42A/11SW	D. R. Pyke Property	-	"	OVD-61-1724 ft.	1981	2.4066	T-2359
	42A	Norcen Energy Resources Ltd.	BM	"	Mag,HLEM, GL	1980	2.3331, 2.3564, 2.3391, 2.3030, 2.3305	T-1966

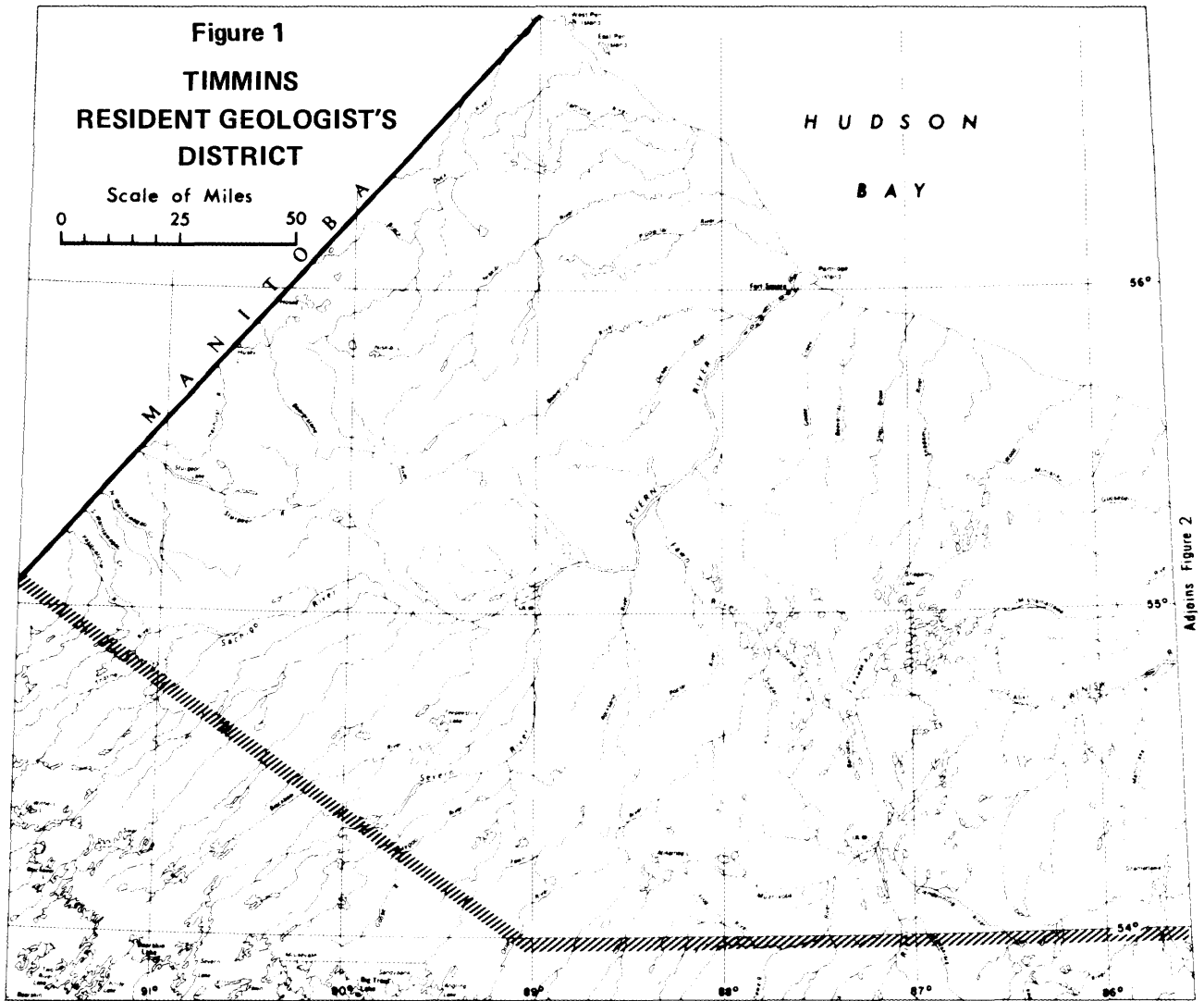
TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Murphy Twp.	42A	Norcen Energy Resources Ltd.	BM	Assess.	Mag, HLEM, GL	1980	2.3331, 2.3564, 2.3391, 2.3030, 2.3305	T-1966
	42A/11	Rosario Resources Canada Ltd.	-	"	OVD-29-1782 ft. DD-5-2491 ft.	1979 1978	-	T-1928
	42A/11SW	Norcen Energy Resources Ltd.	-	"	VLF	1981	2.3883	T-2343
Neville Twp.	410/9,41P/12	Canadian Gold & Metals Inc.	Au	"	AMag, AEM	1980	2.3559	T-2357
Newmarket Twp.	42A/15SW	Surveymin Ltd.	Au	"	Mag, VLF	1980	2.3570	T-2324
North Ridge Lake Area	42J	Selco Inc.	diamonds	"	Mag, DD-3-309 ft.	1980, 1981	2.3878	T-2376, T-2379, T-2341
North Pivabiska River Area	42J/4NE	Selco Inc.	diamonds	"	Mag	1980	2.3729	T-2350
North Fox River Area	42J/4NW	Selco Inc.	diamonds	"	Mag	1980, 1981	2.3729 2.3878	T-2350
Oates Twp.	42B/2,7,8	R. Dubeau Prop.	-	"	rTr	1980	-	T-2377
Ogden Twp.	42A/6	Amax Minerals Expl. Ltd.	-	"	GL, DD-3-438 ft.	1980	2.3797- 2.3801	T-1978
	42A/6NW	Surveymin Ltd.	Au	"	Mag, HLEM, VLF	1980	2.3579	T-2321
	42A/6NW	Texasgulf Canada Ltd	-	"	Mag, VLF	1980	2.3546	T-2327
	42A/6	H.D. Carlson Prop.	-	"	DD-3-1350 ft.	1981	-	T-1887
Onaping Twp.	41P/3,4	Rio Tinto Can. Expl. Ltd.	-	"	DD-12-1342m	1980	2.3011	T-1927
Ophir Twp.	42I	Selco Inc.	diamonds	"	Mag	1980	2.3877	T-2371
Osway Twp.	410/9NW	Kerr-Addison Mines Ltd.	-	"	DD-4-2045 ft.	1980	-	T-2354
	410/9	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3559	T-2357
Ottaway Twp.	42A/14NW	Surveymin Ltd.	Au	"	Mag, HLEM, VLF	1980	2.3610	T-2323
	"	Nahanni Mines Ltd.	Au	"	DD-7-3897 ft.	1981	-	T-2323
Parnell Twp.	42G/7NW	J. Lateyne Property	-	"	rTr, sTr	1980	-	T-1864
	42G/7NW	M. Lupien Property	-	"	DD-1-80, sTr, rTr	1979, 1980	-	T-2332
Pearce Twp.	42G/9NW	Harper Consulting Service Ltd.	-	"	Mag, EM, Geol.	1980	-	T-2326
Penhorwood Twp.	42B/NE	Steetley Talc Ltd.	talc	"	Mag	1980	2.3517	T-1985
	42B/1E	R. Tremblay Property	-	"	manual labour	1981	-	T-1940
Pitt Twp.	41/I	Selco Inc.	diamonds	"	Mag	1981	2.3877	T-2371
Pivabiska River Area	42J/12SE	Selco Inc.	diamonds	"	Mag	1980	2.3729	T-2350
Potier Twp.	410/9,41P/12	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3559	T-2357
Prosser Twp.	42A/14SE	Abitibi Price Inc.	-	"	DD-3-2284 ft.	1981	-	T-2344
	42A/11NE	Frankfield Expls. Ltd	-	not assess.	Prospectus	1980	-	T-1637
	42A/14SE	Gold Shield Syndicate	-	assess.	DD-4-1914 ft.	1980	2.2872, 2.3243, 2.3694	T-1915
	42A/14SE	Texasgulf Canada Ltd	-	"	AMag	1980	2.3940	T-1741
Reaume Twp.	42A/14NE	Surveymin Ltd.	-	"	Mag, EM	1981	2.3840	T-2361
Reeves Twp.	42B/1NE	Steetley Talc Ltd.	talc	"	Mag	1980	2.3517	T-1985
	42B/1E	Texasgulf Canada Ltd.	-	"	GL	1980	2.3530	T-1945
	42B/1NE	F. Levacque Property	-	"	rTr, linecutting	1980	-	T-2335

NORTHERN — TIMMINS

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Reid Twp.	42A/13SE	Rosario Resources Can. Ltd. & Utah M. Ltd.	-	Assess.	Mag, HLEM OVD-23-2312 ft.	1979 1981	2.3441 2.3929	T-1841 T-1841
	42A/11NW	Texasgulf Canada Ltd	-	"	OVD-17-1828 ft.	1980	-	T-1869
	42A/12,13, 14	Gulf Minerals Canada Ltd.	-	"	DD-25-10,241 ft. DD-4-1801 ft.	1981 1981	- -	T-1929 T-2367
Ridge Lake Area	42J/6	Selco Inc.	diamonds	"	Mag	1981	2.3878	T-2368, T-2369
Robb Twp.	42A/12	The Sulphide Syndicate	-	"	HLEM	1980	2.3547	T-1936
Rollo Twp.	410/5NE	Carlson Mines Ltd.	Ag,Au	"	GL, linecutting	1980	2.3524	T-1987
St. Louis Twp.	410/9,41P/ 12	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3559	T-2357
Sewell Twp.	42B/1NE	Texasgulf Canada Ltd	-	"	GL	1981	2.3517	T-1945
Shaw Twp.	42A/6NE	Rosario Resources Canada Ltd.	Au	"	VLF, AMag, GL	1979, 1980	2.3401, 2.3544, 2.3401	T-1052 T-2320 T-2320
			Au	"	DD-6-2897 ft.	1981	-	
	42A/6NE	Lacana Mining Corp.	Au	"	DD-1-550 ft.	1980	-	T-2328
	42A/6NE	Hollinger Argu Ltd	Au Au	" "	EM DD-1-550 ft.	1980 1981	2.3521 -	T-1999 T-2328
	42A/6	Amex Minerals Expl. Ltd.	Au	"	Geol.	1981	2.3797- 2.3801	T-1978
Shelley Twp.	41P/3,4	Rio Tinto Can.Expl. Ltd.	-	"	DD-12-1342m	1980	2.3011	T-1927
Shenango Twp.	42B/2,7,8	R. Dubeau Property	-	"	rTr	1980	-	T-2377
Silk Twp.	42B/1SW	Orofino Mines Ltd. (Northgate Exploration Ltd.)	Au	"	GL, Mag, VLF DD-8-2095ft., airphotos	1980 1980	2.3568, 2.3567	T-2126
Slack Twp.	42G/1W	R.Arsenault Prop.	BM	"	rTr	1981	-	T-1935
	42G/1W	J.Arsenault Prop.	BM	"	manual labour	1981	-	T-2363
South Ridge Lake Area	42J	Selco Inc.	diamonds	"	DD-1-87m, Mag	1981	-	T-2342
South Killick Lake Area	42J	Selco Inc.	diamonds	"	DD-1-87m, Mag	1981	-	T-2368
Stetham Twp.	41P/13SE	Beach Gold Mines Ltd	uranium	"	radon gas survey	1980	-	T-1755
Stock Twp.	42A/10SE	Surveymin Ltd.	Au	"	Mag, HLEM, DD-4- 4656 ft.	1980, 1981	2.3569 2.3554	T-2325 T-2330
Sunday Lake Area	32,E,L	Western Mines Ltd.	Au	"	AEM, OVD-5-562 ft	1980, 1981	2.3651, 2.3876	T-2331
	32L	Dome Exploration Ltd	Au	"	EM, Mag	1981	2.3867	T-2349
Swayze Twp.	410/15SE	Falconbridge Nickel Mines Ltd.	Au	"	VLF	1980	2.3618	T-2329
Thorburn Twp.	42A/12,13	Gulf Minerals Canada Ltd.	BM	"	DD-30-4275m	1981	-	T-2367
Thorneloe Twp.	42A/5,6	Texasgulf Canada Ltd	Ag, Au	"	AMag, AEM	1981	2.3888	T-1941
Thomas Twp.	42A/7NW	W.P.M.Resources Ltd	-	not assess.	Prospectus	1980	-	T-1994
	42A/6W	Noranda Expl Co.Ltd	Au	Assess,	Mag, GC	1980	2.3419, 2.3956	T-1657
	42A/11SW	Pamour Porcupine Mines Ltd.	Au	"	VLF, EM	1981	2.3941	T-1954
Tooms Twp.	410/10W	Granges Exploration Ltd.	BM	"	DD-1-273 ft. DD-5-1082 ft.	1980 1981	- -	T-1940 T-1940
Trilsbeck Lake Area	42J,K	Selco Inc.	diamonds	"	Mag, DD-5-1082 ft	1981	2.3878	T-2379
Tully Twp.	42A/10,11	Rosario Resources Canada Ltd.	-	"	HLEM, DD-12-6354 ft.	1980	2.3077, 2.3101, 2.338	T-1946



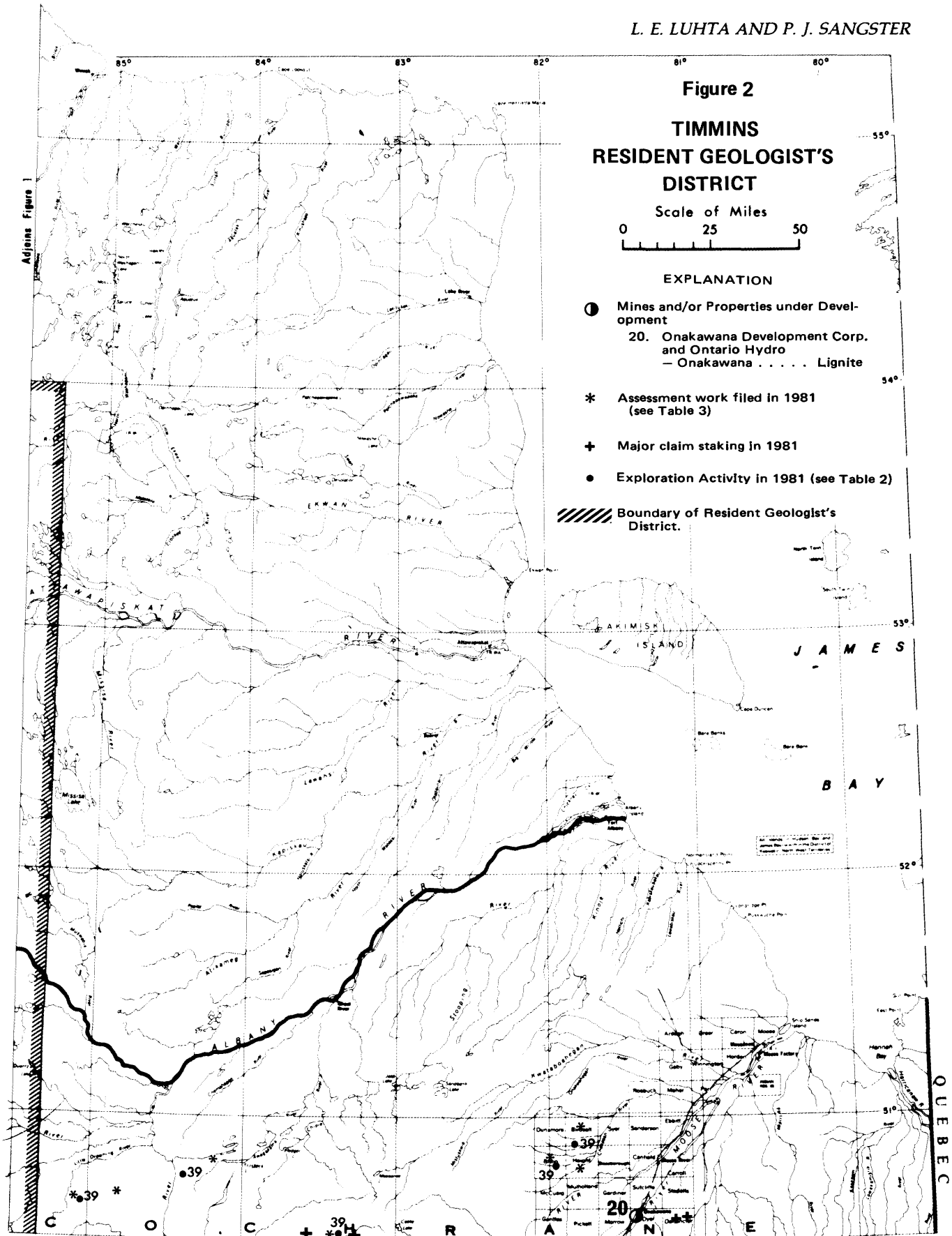
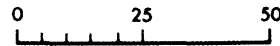


Figure 2

**TIMMINS
RESIDENT GEOLOGIST'S
DISTRICT**

Scale of Miles



EXPLANATION

- ① Mines and/or Properties under Development
 - 20. Onakawana Development Corp. and Ontario Hydro - Onakawana Lignite
- * Assessment work filed in 1981 (see Table 3)
- + Major claim staking in 1981
- Exploration Activity in 1981 (see Table 2)

Boundary of Resident Geologist's District.

Adjoins Figure 1

QUEBEC

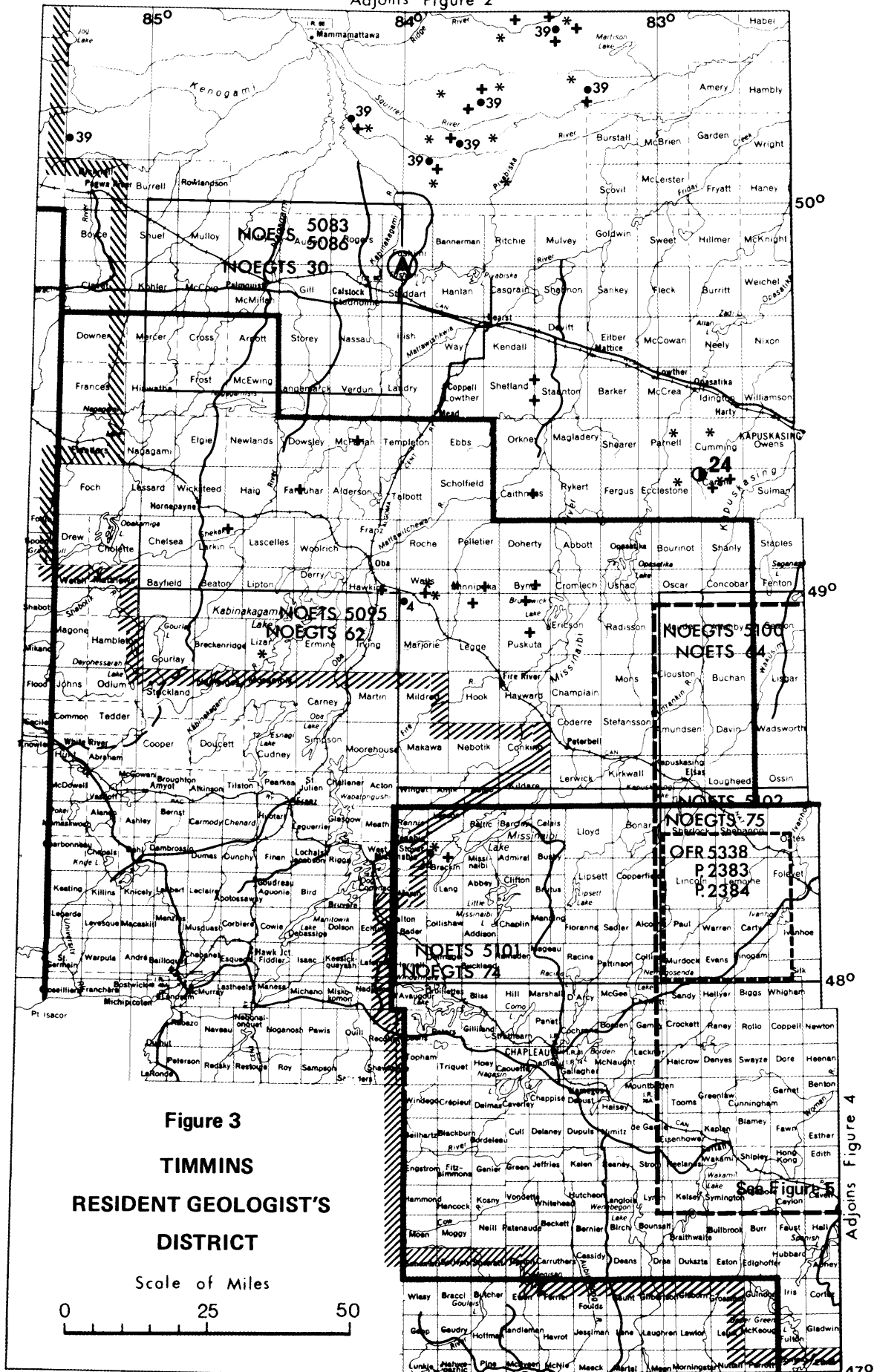
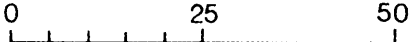


Figure 3

TIMMINS
RESIDENT GEOLOGIST'S
DISTRICT

Scale of Miles



Adjoins Figure 4

Adjoins Figure 5

470

Adjoins Figure 2

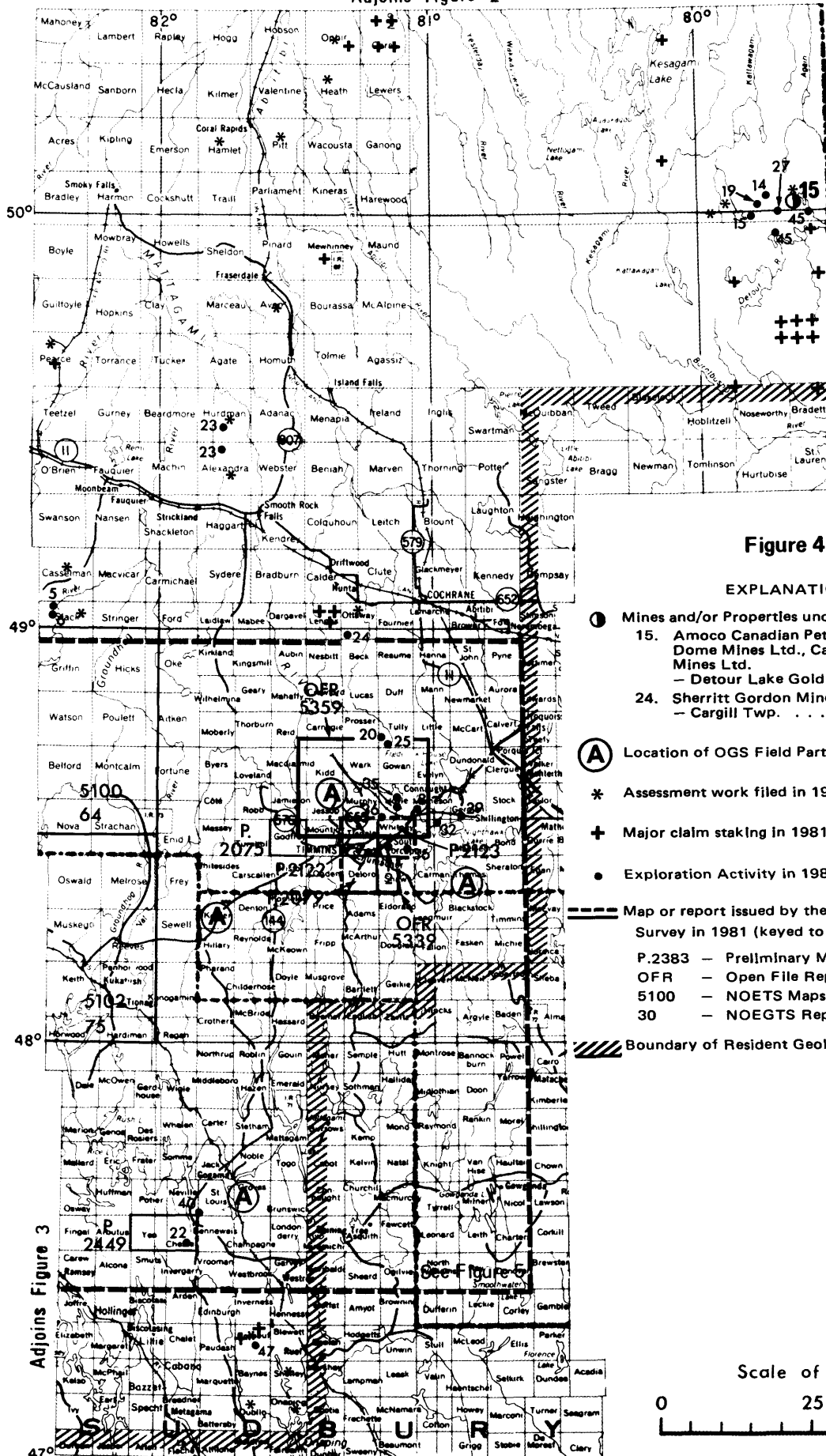
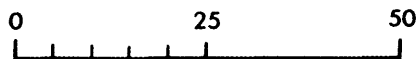


Figure 4

EXPLANATION

- Mines and/or Properties under Development
 - 15. Amoco Canadian Petroleum Co. Ltd., Dome Mines Ltd., Campbell Red Lake Mines Ltd.
 - Detour Lake Gold Property. Au, Cu
 - 24. Sherritt Gordon Mines Ltd.,
 - Cargill Twp. Phosphate
- Ⓐ Location of OGS Field Party in 1981
- * Assessment work filed in 1981 (see Table 3)
- + Major claim staking in 1981
- Exploration Activity in 1981 (see Table 2)
- Map or report issued by the Ontario Geological Survey in 1981 (keyed to Table 1)
 - P.2383 - Preliminary Map
 - OFR - Open File Report
 - 5100 - NOETS Maps
 - 30 - NOEGTS Report
- ▨ Boundary of Resident Geologist's District.

Scale of Miles



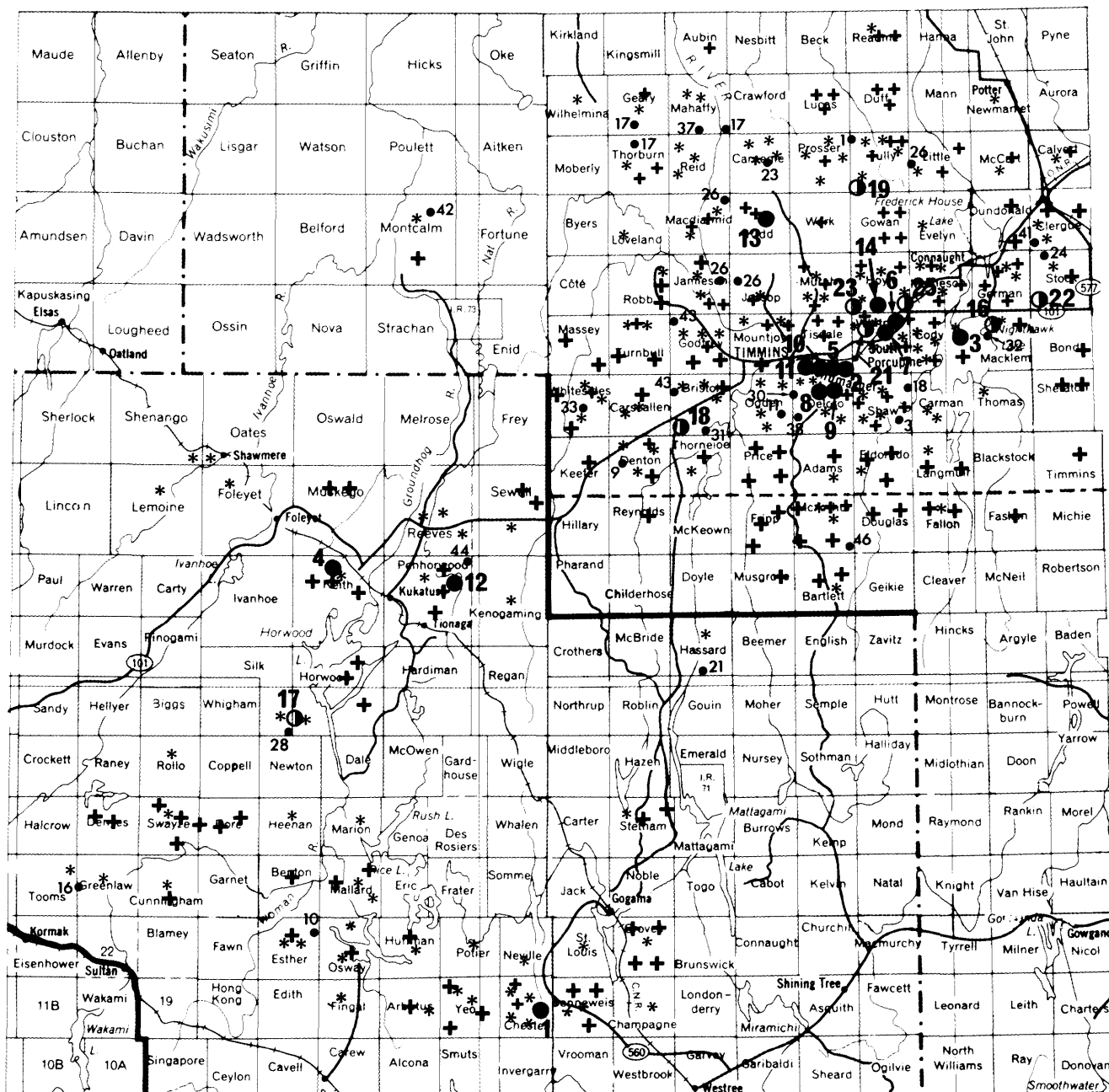


Figure 5

● Producing Mines, 1981

1. Canadian Crest Gold Mines — Chester Twp. property Au, Cu
2. Dome Mines Ltd. — Dome Mine. . . Au, Ag
3. Gold Hawk Porcupine Mines Ltd. Au
4. Mining Corp. — New Joburke Mine . Au, Ag
- 5 — 11 Pamour Porcupine Mines Ltd.
 5. Carlum Property Au, Cu, Mo
 6. Hoyle Property Au, Ag
 7. No. 1 Property Au, Ag
 8. No. 3 Property Au, Ag
 9. Romfield Property Au, Ag
 10. Schumacher Property. . Au, Ag, Cu
 11. Timmins Property. Au, Ag
12. Steetley Talc Ltd. — Penhorwood Mine . talc
- 13 — 14 Texasgulf Canada Ltd.
 13. Kidd Creek Mine Cu, Zn, Ag, Pb, Cd, Sn
 14. Owl Creek Mine Au

EXPLANATION

⊙ Mines and/or Properties under Development

16. Asarco Exploration of Canada Co. Ltd. — Macklem Twp. Au
17. Consolidated Oroflno Resources, — Silk & Horwood Tws. Au
18. Holmer Gold Mines Ltd. — Bristol Twp. Au
19. Nickel Offsets Ltd. (Cromarty Exploration) — Tully Twp. Au
21. Pamour Porcupine Mines, No. 2 Mine — Whitney Twp. Au
22. Quebec Sturgeon River Mines Ltd. — Stock Twp. Au
23. Rosario Resources Canada Ltd., — Hoyle Twp. Au
25. Texasgulf Canada Ltd., Hoyle Pond Property — Hoyle Twp. Au

* Assessment work filed in 1981 (see Table 3)

+ Major claim staking in 1981

● Exploration Activity in 1981 (see Table 2)

Nahanni Mines Limited drilled 3800 feet in Ottawa Township, 2750 feet in Stock Township and 1100 feet in Clergue Township. Encouraging results were obtained in Stock and Clergue Townships. Geophysics and additional drilling is planned (Nahanni Mines Limited, personal communication).

Hollinger Argus Limited drilled three holes on Brown McDade Mines Limited ground in Shaw Township.

Omab Enterprises drilled 12 holes (3825 feet) in the Detour Lake area from November 1980 to June 1981. Low gold values were obtained (Northern Miner, October 1/81). The company also completed two holes in the northeastern part of Hoyle Township (Omab Enterprises, personal communication).

White Star Limited drilled geophysical anomalies on a nine claim gold property in Tully Township. (Northern Miner July 9, 1981).

Teck Corporation completed a few holes in Fallon Township to complete a program initiated in 1980 (personal observation).

J.V. Bonhomme drilled two holes (1500 feet) in Matheson Township (J.V. Bonhomme, personal communication).

Gossan Resources Limited completed an overburden drill program and a small diamond drill program on the old Tex-Sol property in Ogden Township (Gossan Resources, personal communication).

Kennco Explorations (Canada) Limited did a ground geophysical, geochemical and a mapping program on ground in the northern part of Tisdale Township 1000 feet of drilling was also completed. The company also explored in the Hardiman Bay area in Horwood Township (Kennco Explorations (Canada) Limited, personal communication).

Dome Exploration Limited carried out geological mapping, ground geochemical and geophysical surveys in the Detour and Chabbie Lake areas. Drilling is planned. The company also carried out similar programs in Keith, Muskego, and Macklem Townships. Three holes were drilled in Keith Township (Dome Exploration Limited, personal communication).

Westmin Resources Limited carried out mapping ground geophysics and a 10 000-foot overburden program in the Detour Lake area between 1979 and 1981. Drilling is planned in 1982 (Westmin Resources Limited, personal communication).

Consolidated Montclerg Mines Limited completed geophysical surveys in Clergue and Walker Townships (Northern Miner, November 15/81).

Hanson Mineral Exploration Limited is reported to have been exploring in Chester Township near Gogama and Tully Townships north of Timmins (Northern Miner, May 7, June 25/81).

It is reported that Carlson Mines Limited has started a gold exploration program in the Swayze Gold Area (Northern Miner, September 17, 1981).

Dale Pyke completed overburden drilling in Cody and Mountjoy Townships. (Assessment work files).

Andex Limited completed a drilling program started in 1980 on the Aumo property in Denton Township (personal observation). Amax of Canada Limited completed a 5000-foot drilling program in Ogden, Deloro and Adams Townships (Amax of Canada Limited, personal communication).

Cominco Limited has completed an overburden drill program in Matheson Township. Drilling is planned in 1982 (Cominco Limited, personal communication).

Other Activities

Sherritt Gordon Mines Limited, who optioned the interests of the International Minerals and Chemical Corporation (Canada) Limited in the Cargill Township phosphate deposit, conducted a 15 000-foot fill-in drill program using a sonic drill to further define the parameters of the deposit. A quarter of a million cubic yards of overburden was removed to uncover a part of the deposit. Four hundred tons of phosphate material was sent to Lakefield Laboratories for testing. Encouraging results were obtained. However, Sherritt Gordon Mines Limited has announced that due to present economic conditions, a production decision will not be made until 1983. Updated reserves are 20 million tons at a grade of 27.5 percent P_2O_5 or 62 million tons at 19.6 percent. (Sherritt Gordon Mines Limited, personal communication).

Selco Explorations Limited have been very active in drilling for kimberlite structures on staked ground and within the area of their exploratory license of occupation in the southern part of the James Bay Lowland (Selco Explorations, personal communication).

Ontario Energy Corporation had a reverse circulation drill program in 1981 to explore for lignite in the area of their exploratory license of occupation (personal observation).

Onakawana Development Corporation was working on completing an environmental assessment with regard to its lignite deposit 95 km south of Moosonee. No decision has yet been made to go ahead with lignite production (Onakawana Development Corporation, personal communication).

Extender Minerals Limited has a small underground barite mine and mill in the Matachewan area and is planning to develop a barite deposit by underground methods in Penhorwood Township (Extender Minerals Limited, personal communication).

Shell Canada Resources drilled five reverse circulation holes to explore the Martisson Carbonatite complex north of Hearst. A winter road is presently being built so that more drilling can be done in 1982 (Shell Resources Canada Limited, personal communication).

Ontario Geological Survey Activities

Under the Precambrian Geology program, G.M. Siragusa completed mapping and an investigation of previous exploration work in the Pensyl Lake Area. The area covered included parts of Benneweis, Champagne, Groves, and St. Louis Townships and is adjacent to the Jerome Area mapped by Siragusa in 1980.

A.G. Choudhry, also with the Precambrian Geology section, mapped and did research into previous exploration work in Keefer, Denton, and Thorneloe Townships.

The Engineering and Terrain Geology Section was responsible for two Special Projects in the Timmins Resident Geologist's Area. With funding provided by the Ontario Ministry of Northern Affairs, staff of the Aggregate Assessment Office initiated and completed field mapping, testing, and sampling of natural aggregate deposits for the planning areas surrounding four urban centres in Northern Ontario which included Timmins and Smooth Rock Falls. These sites were chosen because there exists a possible future shortage of aggregate in the Smooth Rock Falls area, and it is considered important that care be taken to ensure continuing availability of crushable gravel in the Timmins area.

In addition, J.A. Richard carried out detailed Quaternary field mapping and stratigraphic investigations in the Constance-Hanlon Lakes map-area. Airphoto interpretation, geotechnical boring, soil probing equipment, and examinations of exposures during ground and water traverses provided data. It was noted that large potential aggregate resources still exist, particularly in the Studholme Township kame complex and in northeast Fushimi Township. It was also concluded that development of waste disposal sites in the area should consider the local nature of the Cochrane till that demonstrates significant permeability in the basal facies.

During the summer field season, staff of the Geophysics/Geochemistry Section developed a 1 km² area in northeastern Thomas Township over an electromagnetic conductor for the purpose of testing geophysical equipment.

The Swayze area was surveyed using a Briton-Norman Trislander equipped with a Barringer/Questor Mark VI Input airborne electromagnetometer system and a Sonotek Proton Precession Magnetometer. A total of 12 035 line km of data were collected over the area. Results are to be released on photomosaic-based maps.

The Geophysic/Geochemistry section, over the past three field seasons as part of a Gravity Study in North Central Ontario has established 7 250 gravity stations over an area in excess of 33 000 km². Over 3400 rock density measurements on fresh rock samples have also been obtained by the Ontario Geological Survey simultaneous to the gravity field work. Over 40 of the townships covered by the survey are within the Timmins Resident Geologist's area (Gogama District).

M.A. Vos of the Mineral Deposits Section, completed a Special Project on the Industrial Minerals of the Cargill Complex. Work done included the compilation of an exploration history, detailed geological mapping, and sampling, with emphasis being placed on vermiculite sampling and testing.

Ontario Geological Survey—Published Reports

Although no final reports were published by the Ontario Geological Survey in the Timmins Resident Geologist's area, the following Open File Reports were released this year:

OFR 5338
Riccio, L.

1981:Geology of the Northeastern Portion of the Shawmere Anorthosite Complex.

OFR 5339
Fyon, J.A., and Crocket, J.H.
1981:Gold Exploration in the Timmins Area Using Field and Lithochemical Characteristics of Carbonate Alteration.

OFR 5342
Fortescue, J.A.C., I. Thomson, M. Dickman, and J. Terasmae
1981:Multidisciplinary Followup of Regional pH Patterns in Lakes North of Lake Superior, District of Algoma.

OFR 5359
Hunt, D.S.
1981:Granular Aggregate Resources, Pamour East and West Sheets, City of Timmins.

Ontario Geoscience Research Grants Program

The Ontario Geoscience Research Grants Program was initiated in 1978 as a means of supporting research at Ontario universities to complement work by the Ontario Geological Survey. Of the 29 projects which received funding in 1980-1981, 19 were renewal projects.

Research programs directly related to the Timmins Resident Geologist's Area listed under the principal applicant follows:

Campbell, I.H., University of Toronto—Rare Earth Elements in Acid Volcanics
Crocket, J.H., McMaster University—Stable Isotope Studies, Gold Metallogeny, Timmins
Fyfe W.S., University of Western Ontario—Lode Gold Deposits in Felsic Igneous Intrusions
Naldrett, A.J., University of Toronto—Platinum Group Elements in Magmatic Sulphide Deposits.

Nichol, I., Queen's University—Speciation of Free Gold in Glacial Overburden.

Norris, G., University of Toronto—Mesozoic Polynostratigraphy, Moose River Basin.

Roberts, R.G., University of Waterloo—Hydrothermal Alterations and Gold Vein Environments.

Whitehead, R.E., Laurentian University—Gold Exploration using CO₂, H₂O and Alkali Anomalies.

Projects funded by the Research Grants Program with reference to the Timmins Resident Geologist's area are:

Hutchinson, R.W., University of Western Ontario—Au, Ni, and Cr Deposits in Ultramafic-Mafic Volcanic Rocks.

West, G.F., University of Toronto—Interpretation Support for Electromagnetic Prospecting.

York, D., University of Toronto—Direct Dating of Ore Minerals.

The Ontario Mineral Exploration Program (OMEP)

The Ontario Mineral Exploration Program (OMEP) is a unique program administered by the Ministry of Natural Resources to provide incentives to entrepreneurial individuals and non-mining companies for mineral exploration in Ontario. The Ontario Mineral Exploration Act, 1980, and Regulations came into effect on September 1, 1980.

Basic objectives of OMEP are to offer incentives for exploration of mineral resources in Ontario by providing part of the risk capital and by encouraging individuals and/or non-mining companies to invest in mineral exploration in Ontario.

Under the OMEP program, individuals and non-mining companies are given approximately the same tax advantages on exploration expenditures as are now available to producing mining companies in Ontario.

Since the inception of OMEP, 234 applications representing 62.6 million dollars of estimated expenditures were received. Of this total, 172 programs were designated for an estimated expenditure of 50.3 million dollars. However, total eligible expenditures amount to 41.5 million dollars and result in disbursements of 10.2 million dollars in grants/tax credits.

As of September 1, 1981, there were 126 designated programs in progress. It is of interest to note that of these 126 programs, 60 are in the Northern Region. This represents some 17.5 million dollars or 42.2 percent of the total program expenditure. Most recent figures available on the OMEP program in the Timmins Resident Geologist's area indicate that 29 programs are in progress representing total expenditures of \$11 481 000 and eligible expenditures of \$9 376 000. The resulting disbursements are \$2 344 000 in grants/tax credits.

1981 Report of the Kirkland Lake Resident Geologist

H.L. Lovell¹, and G.P.B. Grabowski²

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Introduction

Claim staking in 1981 remained approximately the same as during the corresponding 11 months of 1980. Claims in good standing are at the highest level since the Texas-gulf Kidd Creek Timmins rush of 1965. Diamond drilling is at the highest level since follow-up diamond drilling in 1968 was done after the 1965 "rush". The Bear Island Indian Caution entered its third year of preventing the recording of mining claims and the raising of funds for exploration in the Matachewan, Gowganda, and Elk Lake mining areas. In January 1981, all Sudbury Mining Division mineral exploration files remaining in Kirkland Lake were transferred to the recently re-opened Cobalt Resident Geologist's Office.

Resident Geologist Staff Activities

Permanent staff included: Howard Lovell, Resident Geologist; Gary Grabowski, Resource Geologist; and Faye

¹Resident Geologist, Ontario Ministry of Natural Resources, Kirkland Lake.

²Resource Geologist, Ontario Ministry of Natural Resources, Kirkland Lake.

NORTHERN — KIRKLAND LAKE

TABLE 1 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1981*	5,043	2,687	14,978	64,335	103,199	17,595	214,461
1980	6,299	1,834	12,622	64,454	115,031	10,981	209,357
1979	4,261	1,452	8,157	29,714	25,352	4,990	69,763
1978	1,710	2,065	5,348	32,602	38,100	8,887	97,144
1977	1,826	2,334	5,703	37,101	45,436	1,920	98,992
1976	2,350	2,979	6,712	47,724	42,339	6,220	102,935
1975	2,916	5,010	7,341	45,380	38,047	6,738	98,620
1974	4,757	2,296	9,435	40,679	55,716	4,441	110,155
1973	3,260	3,214	6,974	34,113	35,811	8,150	92,616
1972	3,253	4,740	6,781	39,371	52,351	3,358	106,026
1971	4,065	3,846	8,268	29,433	48,785	4,764	96,047
1970	4,315	3,704	8,049	25,683	20,683	4,133	73,157
1969	3,404	5,273	7,438	50,892	45,713	15,829	130,185
1968	4,171	7,909	9,307	74,649	82,637	5,799	180,437
1967	5,450	7,341	13,045	79,172	29,073	4,032	143,600
1966	7,606	11,101	14,936	117,544	30,971	8,050	182,352
1965	9,331	6,906	18,431	123,129	88,259	6,530	257,029
1964	12,842	3,884	22,912	77,807	32,644	11,725	149,198
1963	4,710	3,895	13,954	95,696	16,241	4,226	138,627
1962	4,675	4,028	13,139	63,003	5,494	5,099	97,219
1961	3,749	4,451	12,492	47,862	5,494	1,118	79,219
1960	5,024	6,747	13,194	75,123	7,296	4,751	104,632
1959	6,419	5,594	14,917	22,947	3,792	1,404	80,322
1958	8,582	7,108	14,092	37,381	7,481	1,941	66,783
1957	4,664	8,212	12,618	95,934	12,593	3,948	139,891
1956	9,673	3,594	16,166	77,879	20,982	6,693	130,894
1955	4,182	3,999	10,087	75,561	3,389	3,529	105,925

* to Nov. 30

NOTE: 1955 to 1967 includes Larder Lake, Montreal River and Timiskaming Mining Divisions.

TABLE 2 MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

Ontario Geological Survey Reports

GR 204

Open File Reports

OFR 5335 OFR 5349 OFR 5366
 OFR 5337 OFR 5355 OFR 5367
 OFR 5340 OFR 5356 OFR 5368
 OFR 5346 OFR 5358 OFR 5369
 OFR 5348 OFR 5365

Preliminary Maps - Geological Series

P. 2414

P. 2415

P. 2416

Preliminary Maps - Data Series

P. 855 (rev.) P. 2173
 P. 2169 P. 2174
 P. 2170 P. 2175
 P. 2171
 P. 2172

Aggregate Resources Publications

Federal - Provincial Maps

P. 2273 (rev.)

Coloured Maps

2440

Northern Ontario Engineering Geology Terrain Studies Report

NOEGTS 1

Northern Ontario Engineering Terrain Studies Maps

Mineral Resources Branch Publications

MPBP 12 MPBP 13

Miscellaneous Reports

MP 85 MP 86 MP 95
 MP 97 MP 98 MP 100 Occasional Paper No.7

Geological Survey of Canada Open File Reports

St. Jean, clerk typist, who was temporarily replaced by Mary Giovannella in the latter part of the year. Additional help was provided by a draftsman, and Experience '81 student, and a manual labourer.

The variety of activities performed by the Resident Geologist's staff included:

1. Responding to 2 500 inquiries from the mining and exploration industry, government personnel, and the general public.
2. Preparing 45 reports on mineral property examinations, diamond-drill core logging, field trips, and technical papers.
3. Guiding economic geological field trips in the Matachewan and Kirkland-Larder Lakes areas, for 15 groups of mineral explorationists, government, university and foreign geologists, and 3 Ontario Ministry of Natural Resources Junior Ranger camps.
4. Collecting 16 667 m (55 000 feet) of diamond-drill core for the core library to be built in 1982.
5. Preparation of Data Series maps for 6 townships.
6. Evaluating bedrock and aggregate mineral potential for land use planning for Englehart, Charlton, and Dack Townships.
7. Monitoring eight Ontario Geological Survey field parties.
8. Continuing work on a geological map and miscellaneous paper on Gauthier Township.
9. Continuing work on "Geology and Scenery in the Temagami-Iroquois Falls area".

Mining Activity

In 1981, ten mines produced gold and silver boullion, by-product copper, iron pellets, barite, serpentine filler, and peat. In addition, many sand and gravel pits were operated. The following new developments were carried out at mine sites:

Shining Tree Area

Shining Tree Gold Resources, Incorporated

After stripping soil and sampling bedrock, gold-bearing vein zones were bulk sampled and processed through a 10 tonnes per day pilot mill set up at the site.

Gowganda Area

Agnico-Eagle Mines Limited

Castle-Trethewey Mine

During the first half of the year, about 8 000 tonnes of silver ore were mined and trucked to the Penn mill, 120 km away near Cobalt. Since then, underground exploration has continued.

Peerless Silver and Cobalt Exploration Limited

Coleroy Mine

Underground exploration for silver included drifting and about 7 000 m of diamond drilling.

Sandy K Explorations

Lower Bonsall Mine

Underground exploration and development of silver ore was carried out during part of 1981.

Matachewan Area

Extender Minerals Limited

Yarrow Township Mine

Development of a scoop tram decline ramp is nearing completion, and the barite mill is undergoing modifications.

Pamour Porcupine Mines Limited

Matachewan Consolidated Mine

Until late autumn, several open pits were mined and the ore trucked 175 km to the Pamour No.1 mill east of Timmins.

Matheson Area

Kerr Addison Mines Limited

Garrison Mine

Open pit mining was carried out for several months, and the ore was trucked about 145 km to the Kerr Addison Gold Mines Limited gold mill in Virginiatown.

Larder Resources Incorporated

Hardill Property (Blue Quartz Mine)

Exploration for gold ore was carried out underground until mid-year; and surface diamond drilling is planned.

Kirkland Lake Area

Lake Shore Mines Limited

The Kirkland Lake Main Break gold ore zone was diamond drilled (total length, 4 545 m) by means of shallow holes from the surface. Old mill tailings were sampled (combined total about 4 545 m) at contiguous Lake Shore and Wright-Hargreaves past-producers. This evaluation is to delineate parameters for possible future production.

Thunderwood Explorations Limited

Martin-Bird Mine

Considerable bedrock was exposed and mapped in detail by Long Lac Mineral Explorations Limited at this gold exploration project.

Kirkland Lake Resident Geologist Core Library

A core library may be constructed in 1982 for the Kirkland Lake Resident Geologist's area. Approximately 17 000 m of drill core were collected. Mining companies who donated core included: Newmont Exploration Limited (1490 m), Noranda Exploration Limited (2200 m), Amax of Canada Limited (2100 m), Rosario Resources Limited (1100 m), Rio Tinto Canadian Exploration Limited (700 m), Minorex Limited (500 m), Lake Shore Mines Limited (2000 m), and Asarco Exploration Company of Canada Limited (3500 m), and the remainder came from local prospectors and consultants. Core stored in its present location, due to limited space, has been piled "crib style" therefore specific core cannot readily be retrieved. Once put into a library, however, the core will be available for use by the public at some future date.

Property Visits

Cathroy Larder Past Gold Producer

Catharine and McElroy Townships

Amax Exploration Incorporated optioned this property from the controlling shareholder Mirado Nickel Mines Limited. The shaft has four levels down to about 150 m. Short periods of production in the 1940s and 1950s totalled 100 390 g of gold and 30 885 g of silver from 20 180 metric tonnes milled (3 277 ounces Au and 953 ounces Ag respectively from 22 250 tons milled). Most of the ore came from the north zone of pyritic, sheared, and altered fragmental rocks near the shaft. Amax Exploration Incorporated stripped soil from an area located about 300 m southwest of the shaft, above ends of drifts on the 75 m and 150 m levels. The stripping provides excellent exposures of glacially polished and subsequently wavewashed Skead Group intermediate fragmental rocks cut by mafic dikes. The fragmental rocks contain intercalated, coarse and fine, soft greenish grey fragments set in harder whitish matrix. The rock contains 2 percent pyrite, mostly disseminated in the matrix, a few specks of chalcopyrite, and some carbonate. Gold is in the pyrite, and is upgraded along rusty fractures (Gerard Tremblay, personal communication).

A. Decker, A. Pope, and J. Beadman "Moon Lake" Gold Occurrence

Knight Township

The occurrence is underlain by Timiskaming Group trachytic fragmental rocks and older fragmental and spherulitic flows as well as green and grey carbonate rock. Some of the carbonate forms irregular zones.

From 1939 to 1965, a total of 37 holes totalling 1 575 m in length were diamond drilled by Hollinger Consolidated Gold Mines Limited, Camdeck Gold Mines Lim-

ited, Wexford Mines Limited, Initiative Explorations Limited, and Becnite Mines Limited, on ground presently held as a group of 10 claims optioned to Sabine Industries of Vancouver, B.C.

The best reported intersection was about 7.5 m long containing 19 g/tonne (\$21 per ton at \$38 per ounce of gold) according to A. Decker (personal communication). The gold typically is in fine-grained pyrite that is part of quartz veins present in two shear zones or "breaks". The east shear zone is at least 160 m long, and contains only sparse pyrite, except at its junction with the west shear zone. The west shear zone strikes north-south, parallels Hydro Creek Fault, and contains considerable pyrite. The modern approach to gold exploration here would entail bulldozer blade stripping to reveal information on host rocks, gold hosts, fracture patterns, and so forth, followed by "N" core diamond drilling and assaying some or all sludge, depending on core recovery.

M. Dymont and S. Kidston "Group B" Gold Occurrence

Teck Township

As at the Adams Mines, a taconite iron mine, the stratigraphy contains iron formation (magnetite-chert and pyrite-pyrrhotite-chlorite), komatiite (talcosite or Cr-rich) and tholeiite (epidote as well as chlorite). Green (chromic muscovite) and grey (chloritic, sericitic), carbonate rocks have ultramafic as well as sedimentary components. Mafic tuff contains yellow epidote-rich and rusty brown carbonate-rich bands. A contact metamorphic aureole facies around the Murdock Creek syenitic stock consists of magnetic biotite amphibolite cut by syenitic dikes.

Known gold is mainly contained in banded pyrite-pyrrhotite-chalcopyrite-magnetite-black chert, where a grab sample yielded 7 g /tonne, that is 0.2 ounce of gold per ton (M. Dymont, personal communication), and in quartz-carbonate stringers.

Old pits are mostly on high ground, therefore bulldozer blade stripping followed by pressure hosing is feasible. The resultant exposed, glacially polished, bedrock surfaces would reveal gold-host rocks and veins, and stratigraphic tops from which to determine hanging wall barren caprocks and footwall hydrothermal channels. Also, clean surfaces for cutting channel samples using a gasoline-powered, motor-driven, circular diamond saw, would be provided.

Lady Lou Gold Occurrence

Bompas Township

The exposed rock is Coleman Member arkose, that is pink-weathering feldspathic sandstone composed mainly of feldspar and quartz; some of the quartz is clear. Diabase outcrop found in the small waste dump of a two-compartment shaft 15 m deep is slightly magnetic, a characteristic of Matachewan Diabase which is iron-rich tholeiite. This indicates Archean basement rocks are at a shallow depth. The arkose cover rocks are cut by

veins consisting of quartz, pyrite, chalcopyrite, and sphalerite, which yield gold values. Vugs present in some parts of veins are formed of euhedral quartz crystals. The "main known quartz vein zone" is 0.6 m wide and is cut by a brecciated fracture zone containing pyrite, chalcopyrite, and galena. The significance of this occurrence is that it is one of several examples of the cover rocks exposed in the northern part of the Cobalt Embayment that contain gold.

La Porte Gold Occurrence

McNeil Township

These claims are held by L. Weekley, M. King, and S. Beadman. Banded aquagene tuff, a fine-grained, black, massive rock containing disseminated pyrite, stretched pillow basalt, pumiceous lava, and rusty, buff coloured, silicic sericite-albite-carbonate, interflow sedimentary rocks is cut by rusty-weathering pink feldspathic dikes and white quartz-carbonate veins. The southern contact of a large granitic mass occurs about 4 km to the north.

Visible gold is present in the veins, and gold was obtained in assays of host rocks containing pyrite.

Lenora Exploration Limited "Lake Zone" Gold Occurrence

McVittie Township

The ground near an old pit located in bedrock on high ground, has been stripped of soil and the bedrock has been blasted. The old pit is sunk in a quartz-carbonate vein zone about 0.5 m wide that strikes about east-west, dips south, and cuts carbonate-rich rocks. "Green carbonate" conglomerate pebbles form high percentages of one type of carbonate rock. The bright green pebbles contain chromic muscovite. Pebbles characteristically are subangular, slightly deformed, and stand out as smooth glacially polished surfaces in etched rusty brown carbonate-rich matrix. "Brown carbonate" mudstone is composed of pale buff coloured, siliceous, more massive rock containing sericite and disseminated fine-grained pyrite which contains gold values.

High grade veins can be formed by an overlying ultramafic flow supplying heat to remobilize low grade proto-ore.

Loki Gold Occurrence

Holmes Township

The claims are owned by C M B Holdings. Some diamond drilling was done by Coniagas Mines Limited in 1922, Loki Mines Limited in 1946, and Rio Tinto Canadian Exploration Limited in 1980. The host rocks for gold are related to the Cairo Township syenitic stock. These rocks are reddish feldspar porphyry, mylonitized "syenite" (actually diorite and monzonite) that causes VLF anomalies, and lamprophyre. Gold is located in quartz-carbonate-tourmaline-pyrite-chalcopyrite-galena veins and in disseminated pyrite in lamprophyre and pink feldspar porphyry. This type of gold occurrence is particular-

ly prevalent where lamprophyre and pink feldspar porphyry follow faults and/or are altered by reddish hematization, or are bleached by carbonatization and silicification.

Martin-Bird Gold Prospect

Hearst Township

These claims, belonging to Thunderwood Explorations Limited and R.A. MacGregor, are under option to Long Lac Mineral Exploration. Two interconnected shafts have three levels developed, the deepest being at a depth of 114 m. In 1974, Kerr Addison Mines Limited performed a mill test.

Rock types present are; wacke, pink feldspar porphyry, lamprophyre, thin lenses of carbonate mudstone, green (chromic muscovite) carbonate rock, talc-chlorite rock, and "Iron formation" layers that serve as marker strata. Gold, some of it visible, is in quartz veins cutting carbonatized mudstone, and is present also in pyrite in the mudstone (possibly a source bed for the gold), and in feldspar porphyry that is coloured yellow by its higher sericite content.

Mitchell-Hearst Gold Occurrence

Hearst Township

Diamond drilling by Erie Canadian Mines Limited (in 1938), Mitchell-Hearst Gold Mines Limited (in 1944) and Amax Exploration Incorporated (in 1980) totalled 1347 m in length. A concept useful for exploring this general type of gold occurrence (G. Hinser, personal communication) is as follows:

Gold in fine-grained pyrite was precipitated, partly under the influence of organic carbon, with silica and carbonate in a detrital sediment on the sea floor. The resultant muddy ooze, perhaps before it was completely indurated, was engulfed by the ultramafic flow that covered it and incorporated parts of the mudstone. Some ultramafic flows became carbonatized to the extent that these formed green (chromic muscovite) carbonate rock, containing inclusions of buff coloured, more massive, conchoidally fracturing, less coarsely crystalline, carbonate-rich, siliceous, pyritic, sericitic, mudstone.

Where medium to coarse grained, the pyrite underwent re-crystallization, which in an open system dispersed any gold into wallrocks or along the walls of quartz veins. The quartz veins are formed of silica that was driven, along with gold, from the siliceous mudstone by the heat of an ultramafic flow, and subsequently filled fractures in nearby carbonate rock. Quartz veins having carbonate along walls tend to contain no gold because they are intrinsic to the ultramafic flow, having formed from carbonate pore solutions when the flow solidified, with the quartz median precipitated from seawater.

The best host rock for gold is thick, 30 percent carbonate-rich, pyritic, siliceous mudstone that

overlies conglomerate, is topped by graphitic sediment, and is near carbonatized ultramafic rocks containing mudstone rip-ups.

Pawnee-Kirkland (Laberada) Gold Prospect

Lebel Township

During 1927 and 1928, Pawnee-Kirkland Gold Mines Limited sank a shaft to a depth of 272 m with levels at 39 m intervals. In 1936, Regal Kirkland Gold Mines Limited did lateral development, sampling, and diamond drilling underground. In 1966, Labrador Mining and Exploration (Ontario) Limited did lateral development, diamond drilling, and mapping underground. In 1981, Labrador Mining and Exploration mapped outcrops. Rock types range from green (chromic muscovite) carbonate and talc-chlorite-schist of the Larder Lake Group to "trachyte" and jasper-pebble fluvialite conglomerate of the Timiskaming Group. Other rock types of these two groups include: mudstone, white chert, "blue quartzite", and "blue quartz" lenses intercalated with red and green-spotted "trachytes". Gold is present in quartz-carbonate stringers containing pyrite and in blue quartz or cherty lenses that contain pyrite and may be stratabound.

Peerless Silver and Cobalt Explorations Limited "Coleroy" Silver Prospect

Nicol Township

In the period 1910 to 1927, Coleroy Mining Company Limited, Coleroy Gowganda Mines Limited, and other parties sank the Coleroy shaft and developed four levels, the deepest being at a depth of 198 m. In 1980 and 1981, Peerless Silver and Cobalt Explorations Limited raised a headframe, de-watered the shaft, and worked on the 144 m level, doing some drifting, slashing out of diamond drill stations, and diamond drilled a length of 6970 m. Most holes were flat, and had good recovery using "A" core.

The silver-bearing veins cut Nipissing diabase host rocks, the mine workings being located in younger, upper phases of a differentiated, and layered sill. The veins are in areas of Nipissing Diabase transition rock and granophyre. Nipissing Diabase transition rock has a varied texture, grain size, and mineralogy. Alteration patches in Nipissing Diabase contain epidote, calcite, and pink feldspar, and some form granophyre which extends from veins to a few centimetres into wallrocks.

The veins contain dolomite, calcite, quartz, pyrite, chalcopryite, bornite, cobalt, and the nickel minerals, argentite, and native silver. The No. 1 vein cuts Nipissing Diabase containing granophyre and aplite, and approximately parallels Matachewan Diabase that cuts basement "greenstones". At its southern end, probably deeper in the diabase layered sill, the No. 1 vein is spatially related to arcuate joints (incipient cylindroids). The No. 4 vein, which is narrower, but higher in grade, contains less hematite reddening and chalcopryite, and

is deeper in the sill. This vein roughly parallels the schistosity of Archean greenstones, and in places fills incipient cylindroids in Nipissing Diabase.

Shiningtree Gold Resources Incorporated Gold Prospect

Churchill Township

Basic prospecting, bulldozer, backhoe, pressure hose, plugger and explosives, conveyor belt blasting mat, and a gasoline-powered, motor-driven circular diamond saw, have been used to open up the old Corona, Pet, and Nat Young veins. The host rocks for the gold-bearing quartz-carbonate veins are: dark grey basalt, chlorite schist, pyrite and magnetite iron formation, green (chromic muscovite) and other carbonate rocks, and a white-weathering fragmental rock containing sulphide fragments. The highest grade gold is visible, and is located in pyrite in veins that are predominantly composed of white and grey quartz, a little carbonate, and chloritic wallrock inclusions.

A 10 tonne per day mill has been set up on the property, and a bulk sample was tested by Shiningtree Gold Resources Incorporated.

White-Karry Gold Occurrence

Black Township

Diamond drilling (some by Xray and some by "conventional machines") was done in 1945 by Wright-Hargreaves Mines Limited, and in 1947 by White-Karry Gold Mines Limited, and totalled 30 to 40 short holes. Several holes intersected 4 g of gold per tonne across a width of 0.76 m.

Recent bulldozer blade stripping and pressure hose removal of soil by Glenn and Bob Kasner, the present claim holders, exposed an excellent glacially polished section through the gold environment. Host rocks are intermediate fragmental rocks with white carbonate in the matrix, and glomeroporphyritic basalt. Quartz-carbonate veins containing pyrite and visible gold, form high grade zones. Wallrocks are bleached greenish white, and also contain pyrite. In the veins and wallrocks, even medium- to coarse-grained pyrite contain appreciable gold (Glenn Kasner, personal communication). Information to date indicates that the main gold-bearing zone could be bulk sampled or selectively open cut mined over a width of 1 m.

Ontario Geological Survey Activities

L.S. Jensen and N.F. Trowell, under the Federal-Provincial Kirkland Lake Initiatives Program, carried out the third part of a three year stratigraphic mapping study of the Kirkland Lake-Larder Lake "Break" zone from the Quebec border west to Kenogami Lake.

The study of altered volcanic rocks in the Ben Nevis Township area by E.C. Grunsky and funded by the Ontario Ministry of Northern Affairs is in its third and final year.

D.J. Russell studied the Lake Timiskaming Paleozoic outlier.

C.L. Baker investigated the stratigraphy and sedimentation of the Munro Esker east of Kirkland Lake, as part of the Federal-Provincial Kirkland Lake Initiatives Program.

Reconnaissance basal till surveys and related geochemical research in the Kirkland Lake area, were continued as part of Federal-Provincial Kirkland Lake Initiatives Program, by Ian Thomson, D.R. Wadge, and J.T. Lourim.

A.C. Colvine did a reconnaissance survey of the northern part of the Lorrain Formation in search of suitable environments for paleoplacer gold deposition.

The sedimentary framework of placer gold concentrations in basal Huronian strata of the Cobalt Embayment was investigated by D.G.F. Long.

Soussan Marmont and A.C. Colvine studied the geology and mineralization of the Cairo Stock, Matachewan area. This study was funded by the Ontario Ministry of Northern Affairs.

F.R. Ploeger continued the study of gold in alkalic rocks in the Kirkland Lake area as part of the Federal-Provincial Kirkland Lake Initiatives Program.

Research by Other Agencies

Laurentian University

A.E. Beswick: Regional Alteration in Archean Greenstones: Applications to Exploration for Massive Sulphide Deposits.

Max Planck Institute, West Germany

N.T. Arndt: A Study of the Timiskaming Group Trachytes.

McMaster University

F.R. Ploeger and J.H. Crockett: Gold in the Alkalic Rocks of the Kirkland Lake Area.

University of Ottawa

A.D. Pantalone: The Laskowski Gold-Silver Occurrence in the Round Lake Batholith, Kirkland Lake, Ontario.

Queen's University

D. Guindon and I. Nichol: Speciation of Free Gold in Glacial Overburden.

University of Toronto

I.H. Campbell *et al.*: Rare Earth Elements in Felsic Volcanic Rocks Associated with Cu-Zn Massive Sulphide Mineralization.

D.W. Strangway *et al.*: Magnetism and Stratigraphy in Volcanic and Sedimentary Rocks of the Abitibi Belt.

University of Western Ontario

R. Kerrich *et al.*: Field Relations and Geochemistry of Gold, Nickel and Chromium Deposits in Ultramafic Volcanic Rocks.

V.D. MacRae *et al.*: Asbestos Fibre Degradation in Laboratory Solution.

M. Warwick: Gold Mineralization of the Flow Ores at the Kerr Addison Mine.

University of Windsor

T.A. Symons *et al.*: Magnetic and Paleomagnetic Characteristics of the Archean Iron Formation and Host Rocks at the Adam's Mine, Ontario.

Recommendations for Exploration

The favourable Clifford, Ben Nevis, Pontiac, Townships copper-zinc-gold area has been largely overlooked. During the recently intensified interest in gold and silver exploration centred on the Porcupine-Destor and Larder Lake-Cadillac Faults. Although the "Ben Nevis area" is the western extension of the Blake River Group, which hosts most Noranda Quebec area mines, no profitable production has yet come from the Blake River Group in Ontario. Road access is only presently becoming adequate, inasmuch as an Ontario Ministry of Natural Resources access road is being built through the rhyolitic area. Except for the lack of known ore deposits, major differences with the host rocks for the Noranda area mines are mainly the widespread, almost complete absence of metamorphism in the Ben Nevis area rocks, and (L.S. Jensen, geologist with Ontario Geological Survey, personal communication) the related lack of removal of overlying rocks by erosion. This assumes that the metamorphism is a function of depth of burial and resultant proximity to magma chambers. Thus, the Noranda area level of erosion may be, in the Ben Nevis area, 1 or 2 km deep, that is, deeper than is detectable by remote-sensing geophysical and geochemical methods used to date.

Similarities between the Ben Nevis area and the Noranda mines are:

1. Large amounts of Blake River Group calc-alkalic felsic extrusives, for example, quartz-feldspar porphyries, and of silicified mafic extrusives.

2. Volcanic centres at Flavrian Lake at Noranda, and at least two located in Clifford and Ben Nevis Townships.

3. Relatively low grade metamorphism; Noranda's higher metamorphic facies probably is attributable to being closer to magma chambers which presently are evident as felsic to intermediate stocks.

4. The relative absence of structural deformation. The gentle dip of many strata suggests cauldron subsidence was dominant over isoclinal folding.

Noranda area ore environments typically consist of a halo of hydrothermal alteration referred to as "dalmatianite" (chlorite-sericite or anthophyllite ovoids) enveloping a stringer ore zone and related overlying stratabound hot springs ore, which is in turn overlain by a thin graphitic zone, and above it, barren caprock. Blind ore deposits have been discovered almost 1000 m below surface.

Diamond-drill targets for similar ore in Clifford, Ben Nevis, and Pontiac Townships may be as follows:

1. Near high magnetic anomalies, as are most north-western Quebec mines, for example, airborne gradiometer anomalies that screen out deep-seated magnetic influences.
2. "Heavy duty" pulse electromagnetic anomalies.
3. Mercury leakages detected along deep fractures and faults known from geological maps and air photograph lineaments.
4. Alteration haloes, for example, those of carbonate and silica.
5. Gravity anomalies.

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TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

		Abbreviations		Mineral and Metal Symbols	
AEM	- Airborne Electromagnetic Survey	Mag	- Magnetometer Survey	Au	- Gold
A Mag	- Airborne Magnetometer Survey	OVD	- Overburden Drilling (the numbers following "OVD" indicate the number of holes drilled and the total length drilled respectively)	Ag	- Silver
Assess	- Assessment	Pros	- Prospectus	BM	- Base Metal
CS	- Core Samples	Rad	- Radiometric Survey	Cu	- Copper
DD	- Diamond Drilling (where shown, the numbers following "DD" indicate the number of holes drilled and the total length drilled respectively)	SA	- Sampling, Assays	Mo	- Molybdenum
Geochem	- Geochemical Survey	STr	- Soil Trenching	asb	- asbestos
Geophys	- Geophysical Survey	rTr	- Rock Trenching		
GL	- Geological Survey	VEM	- Vertical Loop Electromagnetic Survey		
HLEM	- Horizontal Loop Electromagnetic Survey	VLF	- Very low Frequency Electromagnetic Survey		
IP	- Induced Polarization Survey	SP	- Self Potential Survey		

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Alma	42-A-2	Sylva Explorations Ltd. "Brookbank property"	Au	Assess	DD (1) 103'	1980		
Alma & Holmes	42-A-2	Sylva Explorations Ltd. "Brookbank property"	Au	Assess MEAP	Mag, VLF-EM, SP DD (1) 102'	1980 1980	2.3374 CG 161	
Arnold	32-D-4	Falconbridge Nickel Mines Ltd. "Grid #1"		Assess	Mag, VLF-EM	1981	2.3776	
Arnold & Morrisette	32-D-4	Falconbridge Nickel Mines Ltd. "Grid #4"		Assess	Mag, VLF-EM	1981	2.3679	
Arnold	32-D-4	Lacana Mining Corp. "James option"		Assess	HLEM	1980	2.3435	
Arnold & Katrine	32-D-4	Long Lac Mineral Explorations "Perry Project"		Assess Assess	Mag, GL, VLF-EM DD (3) 996'	1980 1981	2.3724	
Asquith	41-P-11	Patino Mines (Quebec) Ltd. "Seager Lake Claim Group"		Assess	Mag, VLF-EM	1981	2.3880	
Asquith	41-P-11	Patino Mines (Quebec) Ltd. "Shiningtree 1 Project"		Assess Assess	Mag GL	1981 1980	2.3954 2.3518	
Asquith	41-P-11	Patino Mines (Quebec) Ltd. "West Shiningtree Group"		Assess	Mag, VLF-EM	1981	2.3954	
Asquith	41-P-11	Sullivan, W.J.		Assess	DD (2) 201'	1981		
Bannockburn & Montrose	41-P-15	Patino Mines (Que) Ltd.		Assess	Mag, VLF-EM	1980	2.3697	
Barnet	42-A-8	Noranda Exploration Co. Ltd. "1-79"		Assess	Mag, HLEM	1980	2.3294	
Barnet	42-A-8	Canadian Gold & Metals Inc.		Assess	A Mag, AEM	1981	2.3656	
Beatty	42-A-9	Amex Minerals Exploration "Beatty-2"		Assess	AEM	1979	2.3451	
Beatty	42-A-9	Amex Minerals Exploration "Beatty-5"		Assess	GL	1980	2.3479	
Beatty	42-A-9	Amex Minerals Exploration "Beatty-4"		Assess	GL	1980	2.3481	
Beatty & Coulson	42-A-9	Amex Minerals Exploration "Beatty-5"		Assess	GL	1980	2.3480	
Beatty	42-A-9	Ginn, A.P.	Au	Assess Assess	Mag VLF-EM	1981 1981	2.3751 2.3763	
Beatty	42-A-9	Lynco Resources Inc.	Au	Assess Assess	DD (4) 1,068' Mag, VLF-EM	1980 1980		2.3373
Ben Nevis	32-D-5	Harper, H.G. "Goldmac Explorations Inc."		Assess MEAP	Mag, VLF-EM Mag, VLF-EM	1980 1980	2.3388 KL 142	

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ben Nevis & Katrine	32-D-5	Lacana Mining Corporation "James Option"		Assess	HLEM	1980	2.3534	
				Assess	DD (5)	1981		
Benoit & Black	42-A-8	Goliath Mines Limited	Au	Assess	VLF-EM, Mag	1980	2.3462	
			Au	Assess	VLF-EM	1980	2.3371	
Benoit	42-A-8	Lacana Mining Corporation		Assess	Mag, HLEM, GL	1980	2.3582	
Benoit	42-A-8	Portelance, R.		Assess	DD (5) 608'	1981		
Bernhardt	32-A-4							
Morrisette & Teck	42-A-1	O'Connor, F.T.		Assess	DD (3) 1,168'	1981		
Beulah & Moffat	41-P-6	Bazinet, E.W. & Coyne, G.H.	Au	Assess	Mag, VLF-EM	1980	2.3385	
Beulah & Moffat	41-P-6	Meteor Resources Inc.		Assess	AEM, AMAG	1980	2.3656	
Beulah, Hodgetts & Moffat	41-P-6	Vermillion Places		Assess	OVD (40) 2,504'	1980	2.3832	
Bisley	32-D-5	Falconbridge Nickel Mines Ltd.		Assess	Mag (1) VLF-EM (1)	1981	2.3680	
Bisley & Thackeray	32-D-5	Noranda Exploration Co. Ltd. "Thackeray 2-79"		Assess	Mag, HLEM	1980	2.3499	
Bisley, Melba & Thackeray	42-A-8	Rosario Resources Canada Limited		Asses	AEM AMAG	1980	2.3526	
Black	42-A-8	Goliath Mines	See under Benoit Tp.					
Black	42-A-8	Kasner, G.C.	Au	MEAP	sTr, A	1981	KL 160	
				Asses	Mag, VLF-EM	1981	2.3814	
Black	42-A-8	McKinnon, D.	Au	Assess	DD (20) 6,064'	1980		
Blakelock	42-H-9	Noranda Exploration Company Limited		Donation	DD (3) 1,042'	1975		
Boston	32-D-4	Brisbane Mines Ltd.		Assess	A, SA	1980	2.3644	
Boston	32-D-4	Dominion Foundries & Steel Limited		Assess	A, SA	1980	2.3450	
Boston	32-D-4	Falconbridge Nickel Mines Limited		Assess	VLF-EM	1980	2.3617	
Boston	32-D-4	Lampe Resource Co. Ltd. "Boston Moly Property"	Au, Mo	Assess	Mag, VLF-EM, DD (3) 390'	1980	2.3644	
Boston	32-D-4	Marshall Boston Iron Mines Lrd.	Au	Assess	VLF-EM	1980	2.3766	
Bowman	42-A-7	Asarco Exploration Co. of Can. Ltd.		Assess	DD (4) 1,638'	1981		
	42-A-8			Assess	OVD (11) 971'	1980	2.3592	
Bowman	42-A-8	Prospection Limited		Assess	DD (1) 388'	1981		
Bryce	41-P-9	Terry Gold Explorations Inc.	Au	Assess	GL, Mag, Rad, VLF-EM	1981	2.3964	
Bryce	41-P-9	Windjammer Developments Ltd.	Au	Assess	DD (2) 680'	1981		
Burrows	41-P-14	Sirola, B.; Karvinen, W.		Assess	GL	1981	2.3773	
Cabot	41-P-11	Texasgulf Incorporated		Assess	Mag, VLF-EM HLEM	1980	2.3483	
Cairo	41-P-15	Newmont Exploration of Canada Ltd.		Assess	Mag	1980	2.3727	
Cairo	41-P-15	Pamour Porcupine Mines		Assess	Mag, VLF-EM	1981	2.3674	
Cairo	42-A-2	Sylva Explorations Ltd. "Brookbank Property"	See under Alma Tp.				2.3969	
Cane	41-P-9	Cane Consolidated Exploration Ltd.		Assess	GL, VLF-EM	1980	2.3429	
Catharine	31-M-13	Amax of Canada Ltd.	Au	Assess	GL	1981	2.3966	
Catharine	32-D-13	Cook, B.G.	Au	Assess	Mag	1981	2.3806	
Catharine	31-M-13	Link Drilling Limited	Au	Assess	DD (1) 1,007'	1981		

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TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Catharine	31-M13							
	32-D-4	Queenston Gold Mines	Au	Assess	Mag, VLF-EM	1981	2.3699	
Churchill	41-P-11	Patino Mines Ltd.						
		"Shining Tree 1 Property		Assess	GL	1981	2.4026	
				Assess	DD (1) 384'	1981		
Cleaver	42-A-3	Teck Exploration Ltd.		Assess	DD (3) 2,389'	1981		
Clifford	32-D-5	Falconbridge Nickel Mines Ltd.		Assess	VLF-EM, Mag	1981	2.3682	
Connaught	41-P-11	Goldhurst Resources Inc.		Assess	VLF-EM	1981	2.3960	
Connaught	41-P-11	Patino Mines (Que) Ltd.		Assess	Mag, HLEM	1980	2.3584	
				Assess	GL,DD (4) 1,601'	1981	2.3960	
Cook	42-A-8	Hobbs, L.G.		Assess	DD (1) 1,037'	1981		
Coulson	42-A-9	Amax Minerals Exploration "Beatty-5"	See under Beatty Tp.				2.3480	
Coulson	42-A-9	Mattagami Lake Exploration Limited		Assess	DD (1) 497'	1980		
Currie	42-A-7							
	42-A-8	Asarco Exploration Co. of Canada Ltd.	See under Bowman Tp.					
Dack	31-M-13	Mowat, A.	Au	Assess	GL	1980	2.3370	
			Au	Assess	HLEM	1980	2.3589	
Doon	41-P-15	Bagdad Exploration Associates Inc.		Assess	Geochem	1979	2.3322	
Dunmore & Terry	42-A-1	Terry Gold Exploration Inc.		Assess	VLF-EM, Rad,			
	42-A-2			Assess	Mag, GL	1981	2.3686	
Eby	42-A-1	Lacana Mining Corp.		Assess	HLEM	1980	2.3508	
Eby	42-A-1	Noranda Exploration Co. Ltd. "Eby 1-79"		Assess	Mag, HLEM	1980	2.3555	
Eby & Otto	42-A-1	Noranda Exploration Co. Ltd. "Eby 1-79"		Assess	Mag	1980	2.3377	
Edwards	42-A-15	Amax Minerals "Otto" Exploration"Edwards-1"		Assess	GL	1980	2.3462	
Edwards	42-A-15	Amax Minerals Exploration"Edwards-2"		Assess	GL	1980	2.3466	
Frecheville & Holloway	32-D-12	Amax Minerals Expl. "Holloway-1"		Assess	AMag, AEM	1980	2.3606	
Frecheville		Noranda Exploration Co. Ltd. "1-78"		Assess	GL	1979	2.3528	
Galna, Kerrs, Knox Moody	42-A-16	Utah Mines "Jim's Lake property"		Assess	OVD (18) 3,473'	1981	2.3955	
Garibaldi	41-P-6	Vermillion Placers Inc.	Au	Assess	VLF-EM	1981	2.3691	
Garrison	32-D-5,12	Falconbridge Nickel Mines Limited "Canyon Claims"		Assess	Mag, VLF-EM	1980	2.3447	
Garrison & Michaud	32-D-5	Windjammer Power & Gas Ltd.		Assess	GL, Mag, IP	1980	2.3520	
Gauthier	32-D-4	Casan Mining Ltd.	Au	Assess	DD (1) 205'	1980		
Gauthier	32-D-4	Lacana Mining Corp.	Au	Assess	HLEM	1980	2.3507	
				Assess	GL	1981	2.4118	
Gauthier	32-D-4	Leahy, M.	Au	Assess	DD (1) 104'	1981		
Gauthier	32-D-4	MacGregor, R.A.	Au	MEAP	DD (1) 401'	1980	KL 149	
			Au	Assess	Geochem	1980	2.3587	
Grenfell	42-A-1	Falconbridge Nickel Mines Ltd.		Assess	Mag, VLF-EM	1981	2.3681	
Grenfell	42-A-1	Golden Summit Mines Ltd.		Donation	Correspondence	1944		

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Grenfell	42-A-1	Minorex Limited "Kapakita Creek Property"		Assess	DD (1) 303'	1981		
Grenfell	42-A-1	Sirola, D.G.	Au	Assess	GL, HLEM, Rad	1980	2.3540	
Guibord	42-A-9	Amax Minerals Exploration	Au	Assess	sTr, A	1981	2.3433	
Guibord	42-A-0	"Guibord-2" Amax Minerals Exploration		Assess	VLF-EM	1980	2.3522	
Guibord	42-A-8	"Guibord-3" Armco Mineral Exploration Ltd.		Assess	GL Geochem	1981	2.4064	
Guibord	42-A-8	"Main Property Group" Armco Mineral Exploration Ltd.	Au	Assess	GL	1981	2.4065	
Guibord	42-A-8	"Parsons property" Armco Mineral Exploration Ltd.		Assess	GL, Mag, VLF-EM	1980	2.3668	
Guibord	42-A-8	"Road Property" Johns-Manville Canada Inc. "Joseph Group"		Assess	Mag, VLF-EM	1981	2.3665	
Halliday	41-P-14	Norcen Energy Resources Ltd.	Au, BM	Assess	Mag, GL, VEM	1980	2.3357	
Harker	32-D-5	Amax Minerals Exploration "Harker-2"	Au	Assess	AMag, AEM	1981	2.3839	
Harker	32-D-5	Amax Minerals Exploration "Harker 3"	Au	Assess	Mag	1980	2.3655	
Hearst	32-D-4	Amax Minerals Exploration "Many Metals Option"	Au	Assess	DD (6) 1,739'	1981		
Hearst	32-D-4	Colex Explorations Inc.	Au, BM	Assess	DD (3) 1,626'	1981		
Hearst	32-D-4	Cunningham, L.J.	Au	Assess	DD (5) 2,019'	1980	2.3422	
Hearst	32-D-4	Falconbridge Copper Corp. "Estrangement Lake Group"	Au, BM	Assess	Mag, VLF-EM	1980	2.3381	
Hearst	32-D-4	Falconbridge Copper Corp. "Extension Group"	Au, BM	Assess	VLF-EM	1980	2.3431	
Hearst & McElroy	32-D-4	Falconbridge Copper Corp. "Larder Lake Project"	Au, BM	Assess	Mag, VLF-EM	1980	2.3596	
Hearst	32-D-4	Kerr Addison Mines Ltd. "Raven River- MacGregor Option"	Au	Assess	DD (8) 3,544'	1980		
Hearst	32-D-4	MacGregor, R.A. "Group 3"	Au, BM	Assess	DD (16) 888'	1981		
Hearst	32-D-4	MacGregor, R.A. "Larder Townsite prop."	Au	Assess	DD (1) 395'	1981	2.3619	
Hearst	32-D-4	MacGregor, R.A. "South Grid-A1"	Au, BM	Assess	DD (2) 1,107'	1981		
Hearst	32-D-4	Ploeger, F.R.	Au, BM	Assess	Mag, VLF-EM	1981	2.3513	
Hearst, McFadden, Rattray & Skead	31-D-4	Noranda Exploration Co. Ltd. "MacGregor Option"	Au, BM	Assess	GL, Rad	1981	2.3994-5	
Hearst & McFadden	32-D-4	San Rafael Resources Ltd.	Au, BM	Assess	VLF-EM, Mag	1981	2.3529	
Hearst	32-D-4	Thunderwood Explorations Ltd.	Au	Assess	DD (5) 2,035'	1981	2.3741	
Hearst & Skead	31-M-13	Utah Mines Ltd.	Au	Assess	Mag, HLEM	1980	2.3408	
	32-D-4	"Manor Property"	Au	Assess	GL, DD(6) 2,249'	1980	2.3459	

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TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hincks	42-A-3	Newmont Exploration of Canada Ltd. "Blocks A & B"	Au	Assess	SA	1980	2.3407	
Hislop	42-A-9	Ginn, A.P. & Parsons, G.E.		MEAP	DD (1) 2,348' Mag, SA, GL	1980	KL 145	
Hislop	42-A-8	Pamour Porcupine Mines Ltd.		Assess	DD (1) CS 402'	1980		
Hislop	42-A-9	Pamour Porcupine "Vimy Group"	Au	Assess	Mag	1980	2.3628	
Hislop	42-A-8	Parsons, G.E.		Assess	Mag, GL	1981	2.3723	
Hoblitzell	32-E-12	Hudbay Mining Ltd.	BM	Assess	AEM	1980	2.3933	
Hoblitzell	42-H-9	Noranda Exploration Co. Ltd.	BM	Donation	DD (1) 250'	1976		
Hodgetts	42-P-6	Vermillion Placers Inc		See under Beulah Tp.				
Holloway & Frecheville	32-D12	Amax Minerals Exploration "Holloway 1"		See under Frecheville Tp.				
Holloway	32-D-5	Amax Minerals Exploration "Holloway 2"	Au, BM	Assess	DD (2) 1,339'	1981		
Holloway	32-D-12	Hennessey, A.W.	Au	MEAP	SA	1979	KL 143	
Holloway	32-D-5	Johns-Manville Canada Ltd.		Assess	rTr	1981		
Holmes	42-A-1-2	Rio Tinto Canadian Exploration Ltd. "Cunningham claims"	Au	Assess	Mag, Vlf-EM	1980	2.3457	
Holmes	42-A-2	Sylva Explorations Ltd. "Brookbank Prop."		See Alma Tp.				
Holmes	42-A-2	Sylva Explorations Ltd. "Group of Seven"	Au	Assess	SP, Geochem, Mag, VLF-EM	1979	2.3194	
Hurtubise & Noseworthy	32-E-12	Noranda Exploration Company Ltd.		Donation	DD (1) 260'	1976		
Hutt	41-P14	Norcen Energy Resources Limited		See under Halliday Tp.				
Katrine	32-D-4	Lacana Mining Corporation		See under Ben Nevis Tp.				
Katrine	32-D-5	Lacana Mining Corporation	Au, BM	Assess	HLEM	1980	2.3533	
Katrine	32-D-14	Long Lac Mineral Expl. "Perry Project"		See under Arnold Tp.				
Katrine	32-D-4	Noranda Exploration Co. Ltd.		Assess	DD (1) 390', Mag, VEM	1980	2.3868	
Kerrs	42-A-9	Denison Mines Ltd.	Au	Assess	sTr	1979	2.3195	
Kerrs	42-A-9	Dome Exploration (Canada) Ltd.			DD (8) 5,280'	1980		
Kerrs & Rayner Lake	42-A-9	Noranda Exploration Co. Ltd. "Kerrs 1-77"	Au	Assess	OVD (27) 3,564' OVD (36) 4,814' DD (1) 695'	1980 1980 1980	2.3347 2.3484	
Kerrs	42-A-16	Utah Mines Ltd. "Jim's Lake prop."		See under Galna Tp.				
Knox	42-A-9,16	Amax Minerals Exploration "Knox-1"		Assess	GL	1980	2.3478	
Knox & Rickard	42-A-9	Amax Minerals Exploration "Rickard-3"		Assess	GL	1980	2.3472	
Knox	42-A-16	Utah Mines Ltd. "Jim's Lake prop."		See under Galna Tp.				
Lebel	32-D-4	Canadian Nickel Co. Ltd.		Assess	GL	1981	2.3926	
Lebel	32-D-4	Forbes, C. & Leahy, M.	Au	Assess	SA	1980	2.3639	
Lebel	32-D-4	Gamble, S.G.	Au	Assess	Mag, rTr	1981	2.3821	

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lebel	32-D-4	Labine, M.J.	Au, Cu	Assess	VFL-EM	1979	2.3069	
Lebel	32-D-4	Lampe Resource Co. Ltd.	Au	Assess	sTr, A	1980	2.3646	
Lebel	32-D-4	Minorex Limited "Heart Lake Property"	Au, BM	Assess	GL, HLEM, Rad	1980	2.3541	
Lebel	32-D-4	1980 E.N.R. Partnership Ltd. "Moffat Hall Gold Property"	Au	Assess	VLF-EM, GL, Mag	1981	2.3675 2.3898	
Lebel	32-D-4	O'Connor, F.T.	Au	Assess	DD (1) 165'	1981		
Lebel	32-D-4	Rio Tinto Canadian Exploration Limited	Au, BM	Assess	Mag, HLEM, VL-EM			
Maisonville	42-A-1	Bronson Mines Limited		Assess	Mag	1981	2.3849	
Maisonville	42-A-1	Cana Exploration Consultants Ltd.		Assess	GL, Mag, VLF-EM	1980	2.3607	
Maisonville	42-A-1	Dalhousie Oil Corp.		Assess	HLEM	1980	2.3641	
Maisonville	42-A-1	Lacana Mining Corp. "Kapakita Group"		Assess	HLEM	1980	2.3537	
Maisonville	42-A-1	Noranda Exploration Company Limited "Maisonville 1-79"		Assess	Mag, HLEM	1980	2.3555	
Maisonville	42-A-1	Onaping Resources Ltd		Assess	VLF-EM	1981	2.3871	
Maisonville	42-A-1	Rio Tinto Canadian Exploration Ltd.		Assess	DD (1) 361'	1981		
Marter	31-M-13	Falconbridge Nickel Mines Ltd.		Assess	Mag, VLF-EM	1981	2.3777	
Marter	31-M-13	Rio Tinto Canadian Exploration Limited "Grids A & B"		Assess	Mag, HLEM	1980		
Melba	32-D-5 & 42-A-8	Rosario Resources Canada Limited	See under	Bisley	Tp.			
Michaud	42-A-8	Falconbridge Nickel Mines Ltd.		Assess	DD (1) 396'	1980		
Michaud	42-A-8	Redstone Resources Inc.		Assess	VLF-EM, Mag, HLEM-EM	1980	2.3502	
Michaud	42-A-8	Tesluk, J.		Assess	DD (1) 506'	1981		
Michaud	42-A-8	Windjammer Power & Gas	See under	Garrison	Tp.			
Mickle	32-D-5 & 41-P-9	Silverclaim Lake Resources Inc. "Cameron Silver-Cobalt Property"		Assess	DD (18) 7,027'	1980	CG 160	
Midlothian	41-P-15	Bagdad Exploration Assoc. Inc.		Assess	GL, Mag, VLF-EM	1980	2.3378	
Midlothian	41-P-14	Norcen Energy Resources Ltd.	See under	Halliday	Tp.			
Midlothian	41-P-14	United Asbestos Inc.	asb	Assess	Geochem	1979	2.3178	
Moffat	41-P-6	Bazinet, E.W. & Coyne, G.H.	See under	Beulah	Tp.			
Moffat	41-P-6	Meteor Resources Inc.	See under	Beulah	Tp.			
Montrose	41-P-15	Patino Mines (Que) Ltd.	See under	Bannockburn	Tp.			
Moody	42-A-16	Utah Mines Ltd. "Jim's Lake Property"	See under	Galna	Tp.			
Morrisette	32-D-4	Falconbridge Nickel Mines Ltd. "Grid #4"	See under	Arnold	Tp.			
Morrisette	32-D-4	O'Connor, F.T.	See under	Bernhardt	Tp.			
Morrisette	42-A-1							
Morrisette	32-D-4	Rosario Resources Canada Limited	Au, BM	Assess	VLF-EM, Mag, GL	1980	2.3706	
				Assess	SA	1980	2.3460	

NORTHERN — KIRKLAND LAKE

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Morrisette	32-D-4	Ward, J.T.	Au	Assess	Mag	1981	2.3706	
				Assess	VLF-EM	1980	2.3593	
Munro & Warden	42-A-9	Amax Minerals						
		Exploration "Munro-2"		Assess	DD (3) 1,032'	1980		
Munro	42-A-9	Amax Minerals						
		Exploration "Munro-3"		Assess	AEM	1979	2.3465	
Munro	42-A-9	Richmond, G.		Assess	S'r, SA	1980	2.3803	
McElroy & Hearst	32-D-4	Falconbridge Copper Ltd. "Larder Lake Project"	See under	Hearst Tp.				
McElroy	32-D-4	Falconbridge Copper Copper Ltd. "Misema River North"		Assess	DD (8) 3,182'	1980		
McElroy	32-D-4	Falconbridge Nickel Mines Ltd.		Assess	VLF-EM	1981	2.3901	
McElroy	32-D-4	Lampe Resources "Chorzepa Option"		Assess	DD (1) 796'	1980		
McElroy	32-D-4	Tagliamonte, F.P.		Assess	VLF-EM	1981	2.3854	
McFadden & Hearst	32-D-4	MacGregor, R.A. "Group 3"	See under	Hearst Tp.				
McFadden	31-M13	Noranda Exploration Co. Ltd. "MacGregor Option"	See under	Hearst Tp.				
	32-D-4							
McFadden & McGarry	32-D-4	Placer Development Ltd.	Au	Assess	ARad	1980	2.3726	
McFadden	32-D-4	San Rafael Resources Ltd.	See under	Hearst Tp.				
McGarry & McVittie	32-D-4	Edomar Resources Inc.		Assess	Mag, VLF-EM	1980	2.3572	
McGarry	32-D-4	Lampe Resource Co. Ltd.		Assess	Mag, VLF-EM (4)	1981	2.3861	
				Assess	DD (2) 686'	1981		
McGarry	32-D-4	Lee Geo-Indicators Ltd.	Au	Assess	GL	1980	2.3426	
				Assess	Mag, VLF-EM	1980	2.3425,7	
McGarry	32-D-4	Malouf, M.		Assess	VLF-EM	1981	2.3927	
McGarry	32-D-4	Noranda Exploration Co. Ltd.		Assess	Mag	1981	2.3717	
McGarry	32-D-4	Placer Development Ltd.	See under	McFadden Tp.				
McGarry	32-D-4	Walker, J.O.		Assess	DD (2) 104'	1981		
MacMurphy	41-P-41	Tut Explorations Inc.	Au	Donation	Pros	1980		
McNeil	42-A-2	King, K.; Weekley, L.	Au	Assess	DD (7), 336'	1981		
McVittie	32-D-4	Edomar Resources Inc.	See under	McGarry Tp.				
McVittie	32-D-4	Lenora Exploration Ltd.	Au	MEAP	S'r, DD (6) 1,458'	1981	KL 153	
				Donation	GL	1981		
McVittie	32-D-4	Noranda Exploration Co. Ltd.		Assess	Mag, HLEM	1980	2.3555	
McVittie	32-D-4	Queenston Gold Mines "McIntosh Property"		Assess	DD (2) 1,004'	1980		
McVittie	32-D-4	Queenston Gold Mines "Rosswall Group"		Assess	HLEM, Mag	1980	2.3488	
McVittie	32-D-4	Smith, Lyman		Donation	DD (1) 58'	1981		
Newman	42-H-8	Noranda Exploration Co. Ltd. "Groups 1-73, 2-73"		Donation	DD (2) 664'	1975		
Noseworthy	32-E-12	Noranda Exploration	See under	Hurtubise Tp.				
Ossian	32-D-4	Lacana Mining Corporation "Grid 1-Waterhen Lake Group"		MEAP	HLEM	1980	KL 163	2.3580
Ossian	32-D-4	Lacana Mining Corporation "Grid -2-Waterhen Creek Group"		MEAP	HLEM	1980	KL 163	2.3535

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ossian	32-D-4	Lacana Mining		MEAP	DD (1) 535' rTr		KL 163	
	32-D-5	Corporation "Grid-3 Central Group"		Assess	GL, HLEM, SA	1980	2.3581	
Ossian	32-D-5	Lacana Mining Corporation "Grid-4 North Group"		MEAP	HLEM	1980	KL 163	
Ossian	32-D-4	Lacana Mining Corporation "James-Barnard Group"		MEAP	VLF-EM	1980	KL 163	
Ossian	32-D-4	Rio Tinto Canadian Exploration Ltd.		Assess Donation	Mag, HLEm DD (6) 410'	1980 1981	2.3468	
Otto	42-A-1	Allsopp, A., Croxall, J. & E.		Assess	DD (3) 1,391	1980		
Otto	42-A-1	Jomi Minerals & Expediting Ltd.		Assess	Rad, Mag	1980 1981	2.3549 2.3819	
Otto	42-A-1	Minorex Ltd. "Blanche River Property"		Assess	Mag, GL, VLF-EM	1980	2.3543	
Otto	42-A-1	Minorex Ltd. "Murdock Creek Property"		Assess	G, VLF-EM	1980	2.3542	
Otto	42-A-1	Noranda Exploration Co. Ltd. "Otto 1-79"	See under	Eby Tp.				
Otto	42-A-1	Rio Tinto Canadian Exploration Ltd.		Assess	VLF-EM, MAG DD (1)	1980 1981	2.3531	
Otto	42-A-1	Vesich, Z.		Assess	DD (3) 315'	1981		
Pacaud	31-M-13	Forbes, C. "Granite Project"		Assess	sTr, SA	1981	2.3769	
Pacaud	31-M-13	Tagliamonte, F.P.		Assess	VLF-EM	1980	2.3566	
Playfair	42-A-8	Playfair Resources		Assess	DD (1) 355'	1981		
Powell	41-P-15	Pamour Porcupine	Au	Assess	DD (1) 150'	1981		
Powell	41-P-15	Sylva Explorations "Bloom Lake Group"		Assess	DD (2) 462'	1980		
Rand	32-D-12	Carling Copper Mines		Assess	VLF-EM, Mag	1981	2.3856	
Ratray & Skead	31-M-13	MacGregor, R.A.		Assess	VLF-EM	1980	2.3369	
	32-D-4	"Ratray Group"						
Ratray	31-M-13	Noranda Exploration Co. Ltd. "MacGregor Option"	See Hearst	Tp.				
	32-D-4							
Rayner Lake	42-A-9	Noranda Exploration Co. Ltd. "Kerrs 1-77"	See under	Kerrs Tp.				
Rickard & Teefy	42-A-10	Amax Minerals Exploration "Rickard 1"		Assess	GL	1980	2.3473	
Rickard	42-A-9	Amax Minerals Exploration "Rickard 2"		Asses	GL	1980	2.3473	
Rickard	42-A-9	Amax Minerals Exploration "Rickard 3"	See under	Knox Tp.				
Rickard	42-A-10	Amax Minerals Exploration "Rickard 4"		Assess	GL	1980	2.3471	
Rickard	42-A-10	Hollinger Mines Ltd. "Rickard 1"		Assess	VLF-EM	1980	2.3515	
Robillard	41P-9,16	Terry Gold Explorations Ltd.	See under	Bryce Tp.				
Skead	31-M-13	Canadian Nickel Company Ltd.		Assess	GL, DD (6) 2,445'	1981	2.4057	
Skead	31-M-13	MacGregor, R.A. "Group B1"		Assess	Mag, VLF-EM	1980	2.3329	
Skead	31-M-13	MacGregor, R.A. "Group G1"		Assess	Mag, GL	1980 1980	2.3418 2.3329	
Skead	31-M-13	MacGregor, R.A.	See under	Ratray Tp.				
	32.-D-4	"Ratray Group"						
Skead	31-M-13	Noranda Exploration Co. Ltd. "MacGregor Option"	See under	Hearst Tp.				
	32-D-4							

NORTHERN — KIRKLAND LAKE

TABLE 3 Continued


Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Skæad	31-M-13	Utah Mines Ltd.	See under	Hearst	Td.			
	32.-D-4	"Minor Property"						
Stoughton	32-D-12	Noranda Exploration Ltd. "Stoughton 1-79"		Assess	DD (1) 534'	1981		
Stoughton	32-D-12	Nufort Resources Inc. "Borden Group"		Assess	Mag, VLF-EM	1981	2.3875	
Tannahill	32-D-5	Crossan, V.P.		Assess	DD (1) 35'	1980		
				MEAP	rTr, SA	1981	KL 152	
Tannahill	32-D-5	Falconbridge Nickel Mines Ltd. "Grid 1"		Assess	Mag, VLF-EM	1981	2.3774	
Tannahill	32-D-5	Falconbridge Nickel Mines Ltd. "Grid 2"		Assess	Mag, VLF-EM	1981	2.3683	
Tannahill	32-D-5	Falconbridge Nickel		Assess	Mag, VLF-EM	1980	2.3775	
Taylor	42-A-10	Hollinger Argus Ltd.		Assess	DD (1) 1,210'	1980		
Teck	42-A-1	Dans, R.E.		Assess	DD (2) 202'	1981		
Teck	42-A-1	Guaranty Trust Company	Au	Assess	DD (4) 645'	1981		
Teck	42-A-1	Jomi Minerals &	Au	Assess	GL	1981	2.3700	
Teck	42-A-1	Lampe Resource Co. Ltd.	Au	Assess	VLF-EM (2),	1981	2.3835	
				Assess	Mag	1980	2.3390	
				Assess	GL, Rad	1981	2.3702	
							2.3689	
				Assess	DD (2) 513'	1981		
				Assess	sTr, SA	1981	2.3838	
Teck	42-A-1	Leahy, M.	Au	Assess	DD (1) 105'	1981		
Teck	42-A-1	McKinnon, D.L.	Au	Assess	VLF-EM, Mag	1980	2.3445	
Teck	42-A-1	Minorex Limited "Armer Lake Property"	Au, BM	Assess	GL, HLEM, Rad	1980	2.3539	
Teck	32-D-4	O'Connor, F.T.	See under	Bernhardt	Tp.			
	42-A-1							
Teck	42-A-1	Queenston Gold Mines Ltd, "Wedge Group"	Au	Assess	Mag	1980	2.3637	
Teck	42-A-1	St. Jean, B.; Williams, D.E., "Teck Hughes Tailings"	Au	MEAP	Geochem	1981	KL 162	
Teck	42-A-1	Stewart, A.K.	Au	Assess	DD (2) 615' CS	1981		
Teck	42-A-1	Texasgulf Canada Ltd. "Teck 42"	Au, BM	Assess	Mag, HLEM, VLF-EM	1980	2.3574	
Teck	42-A-1	Texasgulf Canada Ltd. "Teck 51"	Au, BM	Assess	Mag, HLEM	1980	2.3573	
Teefy	42-A-10	Amex Minerals Exploration "Rickard 1"	See under	Rickard	Tp.			
Teefy	42-A-10	Cominco Limited		Assess	DD (4) 1,780'	1981		
	42-A-15							
Terry	42-A-1-2	Terry Gold Exploration Inc.	See under	Dunmore	Tp.			
Thackeray	32-D-5	Noranda Exploration Co. Ltd. "Thackeray 2-79"	See under	Bisley	Tp.			
Thackeray	32-D-5	Rosario Resources Canada Limited	See under	Bisley	Tp.			
	42-A-8							
Truax	41-P-9	Terry Gold Explorations Inc.	See under	Bryce	Tp.			
	41-P-16							
Tyrrell	41-P-11	Dome Exploration (Canada) Ltd.	Au	Assess	DD (6) 2,155'	1981		
Walker	42-A-9	Carlson, H.D.		Assess	DD (3) 2,000'	1981		
Walker	42-A-10	Falconbridge Nickel Mines Ltd. "T. Bell Property"		Assess	Geochem	1981	2.3661	
Walker	42-A-10	Surveymin Limited "East Railway Project"		Assess	Mag, HLEM, VLF-EM	1980	2.3588	

TABLE 3 Continued

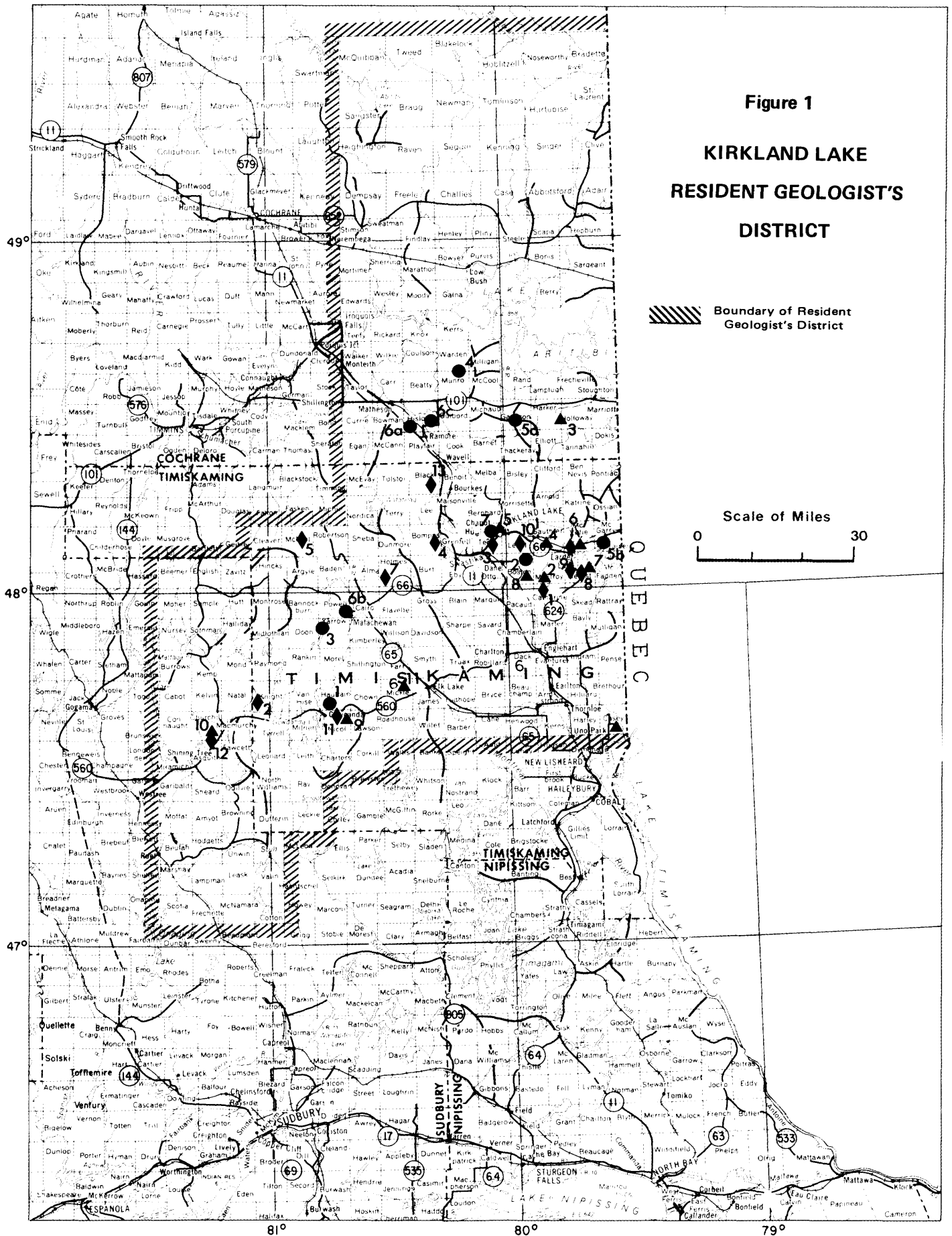
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Walker	42-A-10	Surveymin Limited "Grid C"		Assess	Mag, HLEM	1980	2.3576	
Walker	42-A-10	Surveymin Limited	Au	Assess	Mag, HLEM	1980	2.3553	
Warden	42-A-9	Amax Minerals Exploration "Munro 2"	See under	Munro Tp.				
Warden	42-A-9	Amax Minerals Exploration "Warden-3"		Assess	Mag, DD (1) 640'	1980	2.3698	
Wesley	42-A-15	Amax Minerals Exploration "Wesley 1"		Assess	GL	1980	2.3467	
Wilkie	42-A-9	Amax Minerals Exploration "Wilkie 1"		Assess	GL	1980	2.3476	
Wilkie	42-A-10	Amax Minerals Exploration "Wilkie 2"		Assess	GL	1980	2.3475	
Wilkie	42-A-10	Mattagami Lake Exploration Limited		Assess	DD (3) 2,525'	1980		
Wilkie	42-A-9	Surveymin Limited "Grid K"		Assess	Mag, HLEM	1980	2.3575	
Zavitz	42-A-3	Geolex Resources Ltd.		Assess	Geochem	1979	2.3256	
Zavitz	41-P-3	Newmont Exploration of Canada Limited "Zavitz Project"		Assess	DD (7) 4,667'	1980		

Figure 1

KIRKLAND LAKE RESIDENT GEOLOGIST'S DISTRICT

 Boundary of Resident Geologist's District

Scale of Miles



● Producing Mines

1. Agnico-Eagle Mines Ltd.
Castle-Trethewey Mine Ag
2. Dominion Foundries and Steel Company Limited
Cliffs of Canada Limited Adams Mine Fe
3. Extender Minerals of Canada Limited Barite
4. Hedman Mines Limited. Serpentine filler
5. Kerr Addison Mines Limited
 - a) Garrison Mine Au, Ag
 - b) Kerr Addison Mine Au, Ag
6. Pamour porcupine Mines Ltd.
 - a) Canadian Arrow Mine Au, Ag
 - b) Matachewan Consolidated Mine. Au, Ag
 - c) Ross Mine Au, Ag, Cu
7. Wilroy Mines Limited
Macassa Mine Au, Ag

▲ Properties Under Major Evaluation

1. Agnico-Eagle Mines Ltd. Langis Mine. Ag, Co
2. Amax Minerals Exploration Cathroy Larder Mine Au
3. Amax Minerals Exploration Harker-Holloway Tps. Au
4. Canadian Nickel Company Limited Queenston Mine Au
5. Lakeshore Mines Limited Lakeshore Mine and
Wright-Hargreaves Mines Au
6. Lenora Exploration Limited. Au
7. Longlac Mineral Exploration Limited Martin-Bird Mine Au
8. Marshall Minerals Corporation. Au
9. Peerless Silver and Cobalt Exploration Limited Ag
10. Shiningtree Gold Resources Inc. Au
11. Silver Lake Resources Inc. Ag

◆ Property Visits

1. Cathroy Larder Past Gold Producer
2. A. Decker, A. Pope and J. Beadman
"Moon Lake" Gold Occurrence
3. M. Dyment and J. Kidston "Group B" Gold Occurrence
4. Lady Lou Gold Prospect
5. LaPorte. Gold Occurrence
6. Lenora Exploration Limited "Lake" Gold Occurrence
7. Loki Gold Prospect
8. Martin-Bird Gold Prospect
9. Mitchell-Hearst Gold Occurrence
10. Pawnee Kirkland Gold Prospect
11. Peerless Silver and Cobalt Exploration Limited
"Coleroy" Silver Prospect
12. Shiningtree Gold Resources Inc. Gold Occurrence
13. White-Karry Gold Occurrence

Figure 2

**KIRKLAND LAKE
RESIDENT GEOLOGIST'S
DISTRICT**

EXPLANATION

- * Assessment work file in 1981
(Keyed to Table 3)
- + Major claim staking activity in
1981
- Areas withdrawn from staking through
Bear Island Indian Cautlon.
- //// Boundary of Resident
Geologist's district

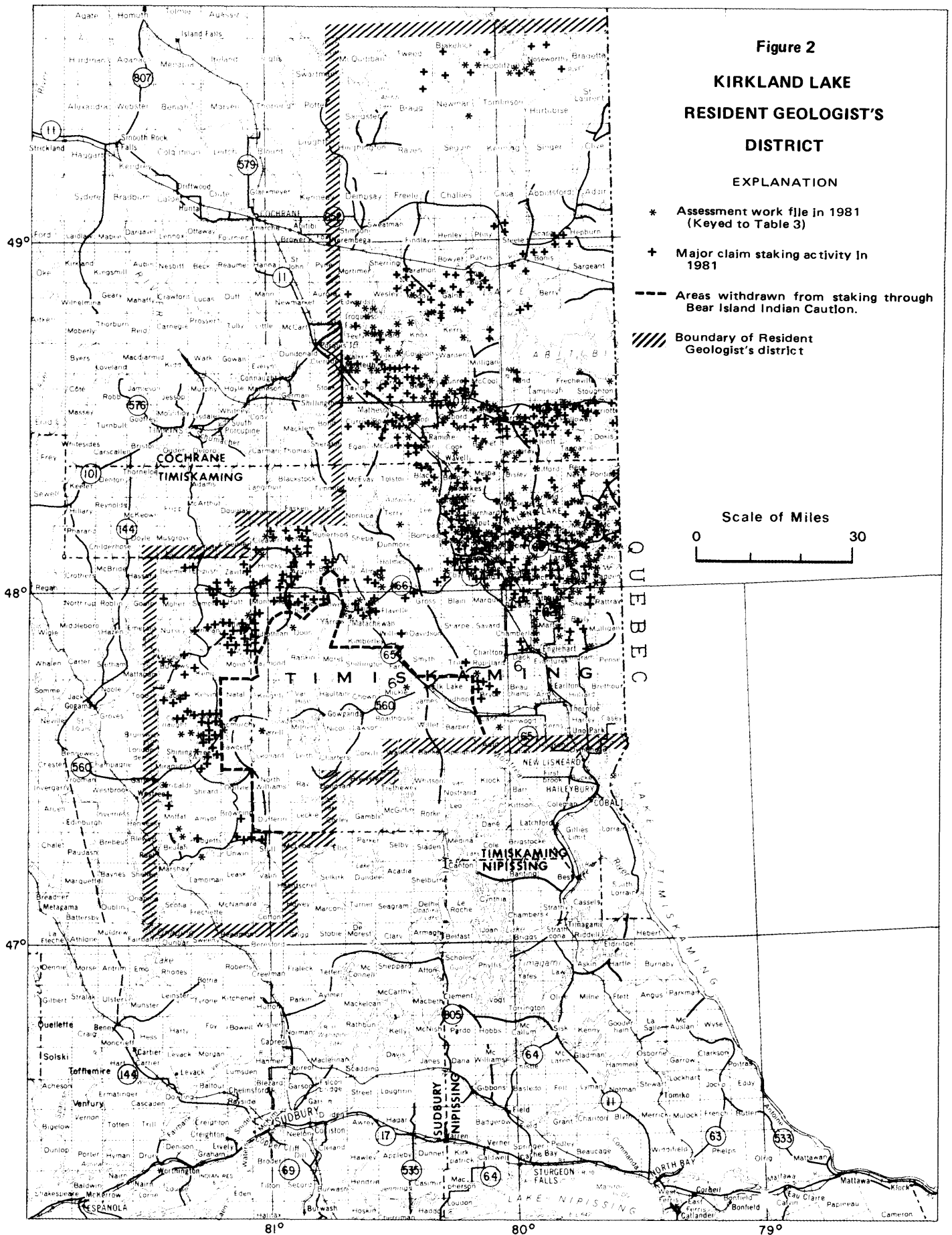
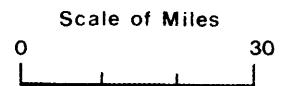


Figure 3
KIRKLAND LAKE
RESIDENT GEOLOGIST'S
DISTRICT

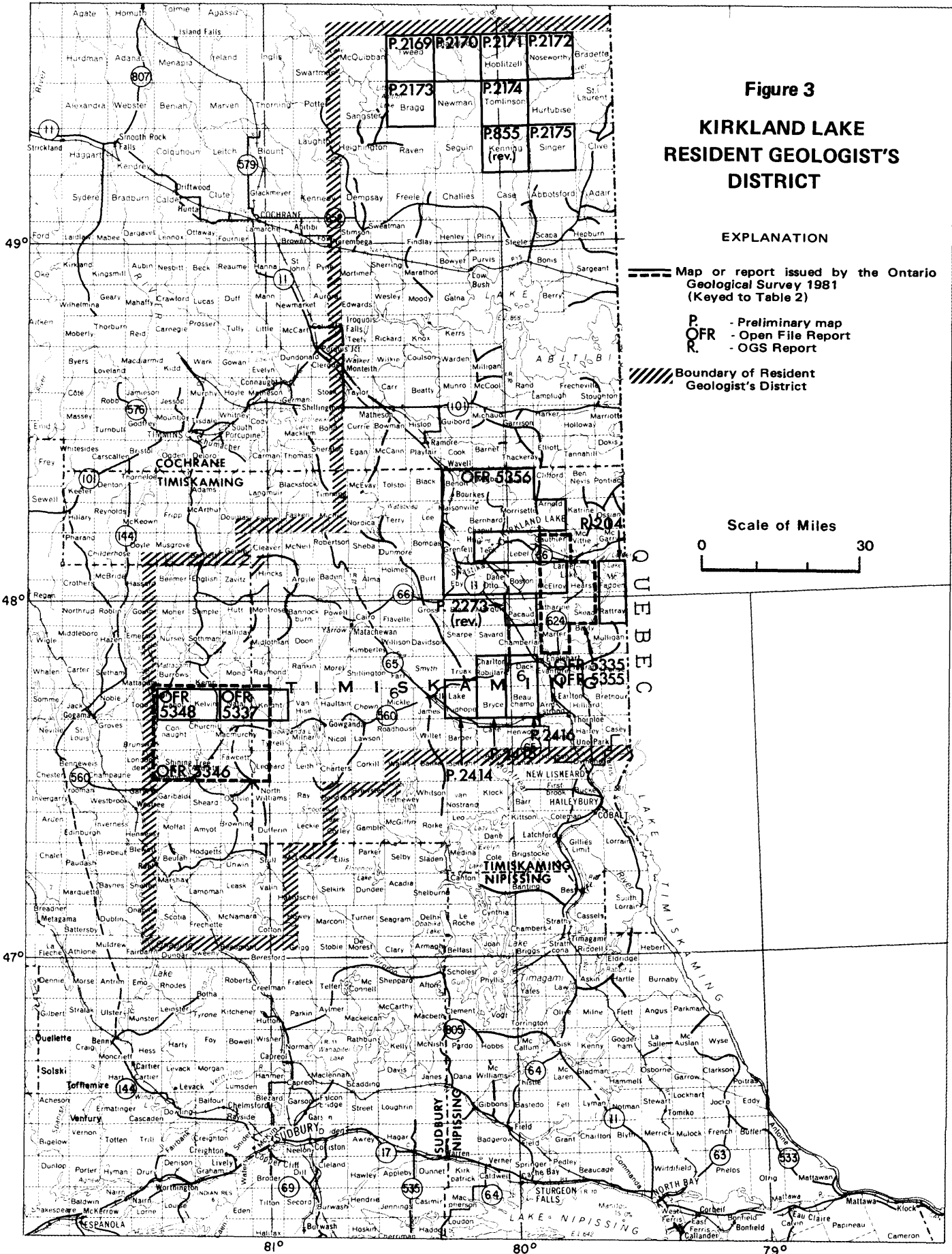
EXPLANATION

--- Map or report issued by the Ontario Geological Survey 1981 (Keyed to Table 2)

P - Preliminary map
 OFR - Open File Report
 R - OGS Report

////// Boundary of Resident Geologist's District

Scale of Miles



1981 Report of the Cobalt Resident Geologist

Leo Owsicki¹

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¹Resident Geologist, Ontario Ministry of Natural Resources, Cobalt.

Introduction

The Ontario Ministry of Natural Resources re-established a Resident Geologist's office in Cobalt after a 14 year hiatus.

Metal prices fell substantially in 1981 from record highs set early in the previous year. Nevertheless, prices still remained historically high and prompted a continuation of increased exploration activity in the Cobalt area. Mining activity, conversely, decreased from mid-1980 to the end of 1981.

The Pan Silver Mine, operated by Pan Continental Mining (Canada) Limited began limited production of silver in mid-1981.

Prices for Ag, Co, Au, and Cu, the commodities most sought after in the area, have decreased from the beginning of 1981 to the present (November 1981) by 45, 60, 30, and 10 percent, respectively. These depressed prices, in conjunction with other negative developments in the area, may adversely affect both exploration and mining activities in the coming year.

The bulk of exploration carried out during the year centred on silver, cobalt, and gold. The search for base metals was relatively limited in comparison.

Renewed interest in gold has slowly spread southwards to include the paleoplacer potential of the Cobalt Embayment and vein-type deposits of the Temagami "greenstone belt".

Resident Geologist's Activities

The office is staffed by one permanent employee, Leo Owsicki, Resident Geologist, and a part-time secretary. One Experience '81 student was employed for a 10 week period as a field assistant.

Initial concerns of the position included establishing the actual office and collecting and re-filing all data pertinent to the area. Familiarization of the local geology was undertaken through a four step program that included: 1) repetitive property visits to all active mines and prospects and discussions with local geologists and prospectors; 2) roadside geology based on existing maps; 3) detailed mapping of a previously unmapped area, and 4) an extensive literature search.

In addition to regular consultative services provided to the general public, government, area prospectors and

mines, input was provided concerning mineral potential in proposed park areas and potentially hazardous lands.

A program of updating maps and re-interpretation of the geology of actively explored properties and mines was initiated. In addition, four data series maps are currently being compiled to assist exploration efforts in the area.

Numerous field trips were conducted for mining, government and academic persons, as well as approximately 45 visits to area mines and properties.

The south half of Lundy Township was mapped in detail (Owsiacki 1981) and the mineral potential established through a radiometric survey and detailed sampling for Ag, Au, U, and Cu mineralization.

Mining Activity

The mining activity in the area has declined substantially from mid-1980 to the present. Mine closures have included the Conisil Mine (Canadaka Mines Limited), University Mine (Canadaka Mines Limited), Chambers-Ferland Tailings (Canadaka Mines Limited) and the Coniagas Mine (Agnico-Eagle Mines Limited). Operations at two developing properties, the Teledyne Decline and Silver Century's King Edward Mine Limited, have been suspended. Pancontinental Mining (Canada) Limited recently established itself in the area following the first shipment of Ag ore in May from its Pan Silver Mine.

Although three mills and two refineries operated during the first half of 1981, two mills have subsequently suspended operations (Agnico-Eagle's Penn Mill (temporary?) and the Canadaka Mill) and the primary refinery, Canadian Smelting and Refining, is operating with a skeleton crew before an announced closure.

Mineral commodities mined during the year included silver, copper, iron ore, limestone, decorative building stone, and sand and gravel.

Beaver-Temiskaming Mine (Agnico-Eagle Mines Limited)

Continuous silver mining, exploration, and development was carried out in 1981. Ore has been stockpiled at the mine site since the October shutdown of the Penn Mill (temporary?).

At present, the Beaver shaft is used for access and hoisting. The adjacent Temiskaming shaft is being rehabilitated to facilitate increased hoisting capacity in the future.

The most promising vein structure now being developed and extended is located in the southeast mine workings and trends east through Archean mafic volcanic rocks beneath the main Nipissing diabase sill.

Coniagas Mine (Agnico-Eagle Mines Limited)

Mining of silver by open pit methods continued to the end of November 1981 at an average rate of 3000 tons per month. Low silver prices and lack of compressed air prompted the recent shutdown of operations. This may be a temporary development pending improved silver prices and mill start-up.

Silver occurs disseminated throughout Huronian paraconglomerates and in very narrow veinlets below an eroded Nipissing diabase sill. The larger high grade veins were stoped out in the past and present mining involves blasting down stope walls and recovering the lower grade wall rock ore.

Pan Silver Mine (Pan Continental Mining (Canada) Limited)

This shaft, formerly the Harrison-Hibbert Mine, was rehabilitated during the latter part of 1980. With the completion of a new headframe, an extensive underground exploration drilling program was initiated in early 1981. During the program, the shaft was deepened by 50 feet, and a new level was established at a depth of 290 feet. Exploration continued in the north part of the mine workings from this level below a previously mined system of silver veins. Sufficient ore was found here to initiate mining, with approximately 3600 tons of ore trucked in May 1981.

Exploration drilling in the extreme south part of the mine workings from the 190-foot level resulted in the discovery of a new vein system. With the completion of mining on the 290-foot level, drifting and development is presently confined to this new vein structure. The veins occur in Huronian paraconglomerates, beneath the lower contact of an eroded Nipissing diabase sill.

Due to the closure of area mills, all ore is presently being stockpiled pending new developments.

Sherman Mine (Dofasco Incorporated and Tetepaga Mining Company Limited)

Production was maintained throughout the year with approximately 1 135 000 tons of iron ore pellets produced and shipped to Dofasco Incorporated in Hamilton. Efforts were concentrated on widening the South and West pits to enhance the mining depth. Diamond drilling to delineate the adjacent Turtle Lake deposit was concluded, and a haulage road built across Turtle Lake to access future mining from the East pit.

Silverfields Mine (Teck Corporation)

The Silverfields Mine continued production of silver throughout the year. The ore was milled at Teck Corporation's Consolidated Summit mill site: low grade flotation is shipped overseas for refining, and high grade gravity ore is processed locally at Canadian Smelting and Refining Limited. With the impending closure of the plant

of Canadian Smelting and Refining Limited, gravity ore is now shipped to Asarco Incorporated in the United States where copper is extracted in addition to the silver.

During the year, exploration was limited to extending a cross-cut on the 5th level onto ground of Cons Summit Mines Limited as part of a joint venture. Drilling from this cross-cut is now well underway.

Silver veins occur primarily in Huronian sediments which outline possible Archean paleochannels. Mining is from "ore" located below the main Nipissing diabase sill.

Industrial Minerals

Numerous small quarrying operations were undertaken intermittently during 1981. In most cases, quarries were located within the Grenville Province (Figure 1), and involved extraction of stone to be used for decorative purposes. The largest such operation is located in McAuslan Township where McLaren's Bay Mica Stone Quarries extracted roughly 2000 tons of stone, some of which was exported to the United States. Recent high interest rates have had an adverse effect on these small operations.

Approximately 6000 tons of limestone was quarried in the New Liskeard area by Dymond Clay Products Limited. Lime produced here is sold primarily to local farms and mines.

Exploration Activity

During 1981, exploration was undertaken for a variety of minerals including silver, cobalt, gold, copper, iron, and vermiculite. Claim staking doubled from the previous year to a total of 227. Surface diamond drilling (Figure 2) totalled 23 115.0 feet from the period December 1980 to December 1981, and underground exploration drilling totalled 64 664.0 feet. Surface drilling activity increased during the fall months and appears to be continuing into the early winter. Most current drilling is for silver and cobalt vein-type mineralization.

Although exploration has been accelerated in the area, the continued negative influence of the Bear Island Indian Caution, the closure of the Ragged Chutes air plant in Cobalt, and falling silver (U.S. \$8.50) and cobalt (U.S. \$9.50) prices will likely have an adverse effect in the coming year.

Major exploration developments during 1981 are summarized as follows:

Silver, as in previous years, was the most sought after commodity. Agnico-Eagle Mines Limited initiated an extensive exploration drill program at the underground workings of the Langis Mine (Casey and Harris Townships) earlier in the year. In addition, a large claim block was staked in the Portage Bay area (Coleman

Township) where a surface exploration program, including diamond drilling, is well under way. Both projects are expected to continue into 1982.

Keely Frontier Resources Limited recently initiated a feasibility study involving rehabilitation of the former silver producing Keely-Frontier Mine (South Lorrain Township). Further development will depend on the results of the report on this study.

Silver Century Limited conducted an extensive drill program from the underground workings of the King Edward Mine (Coleman Township). Although results were encouraging, the program was recently suspended and put on a stand-by basis.

Silverside Resources Incorporated undertook a geophysical survey on holdings in Lorrain Township. Follow-up diamond drilling recently terminated pending new developments.

Gold was actively sought in the metasediments of the Cobalt Embayment. Major companies conducted regional reconnaissance sampling programs in an effort to localize potential Witwatersrand-type paleoplacer gold occurrences.

Exploration for cobalt by Teledyne (Canada) Limited included an intensive surface diamond drill program west of their decline in Bucke Township. Efforts are directed towards establishing reserves by extending known cobalt vein structures and discovering new veins.

Base-metal exploration was limited, and normally took place in conjunction with precious metal exploration programs. Selco Limited staked numerous claims in the Grenville Province, in the vicinity of a sulphide showing. A diamond-drill program conducted during the summer indicated only the presence of pyrrhotite and magnetite. Some effort was directed by companies to finding copper in the Lorrain sediments of the Cobalt Embayment.

Trenching and stripping near vermiculite occurrences by Textan Exploration and Mining Limited indicates a possible interest in this mineral. Vermiculite includes a group of micaceous clay minerals usually derived from alteration of micas in weathering zones (Bates and Jackson 1980). It is used as an insulator and as aggregate in concrete and plaster.

A more complete summary of exploration activity in the Cobalt Resident Geologist's District during 1981 is provided in Table 2 and locations shown on Figures 1 and 1a. Data recently submitted for assessment purposes are summarized in Table 3, and recent Ontario government publications are listed in Table 1.

Ontario Geological Survey Activities

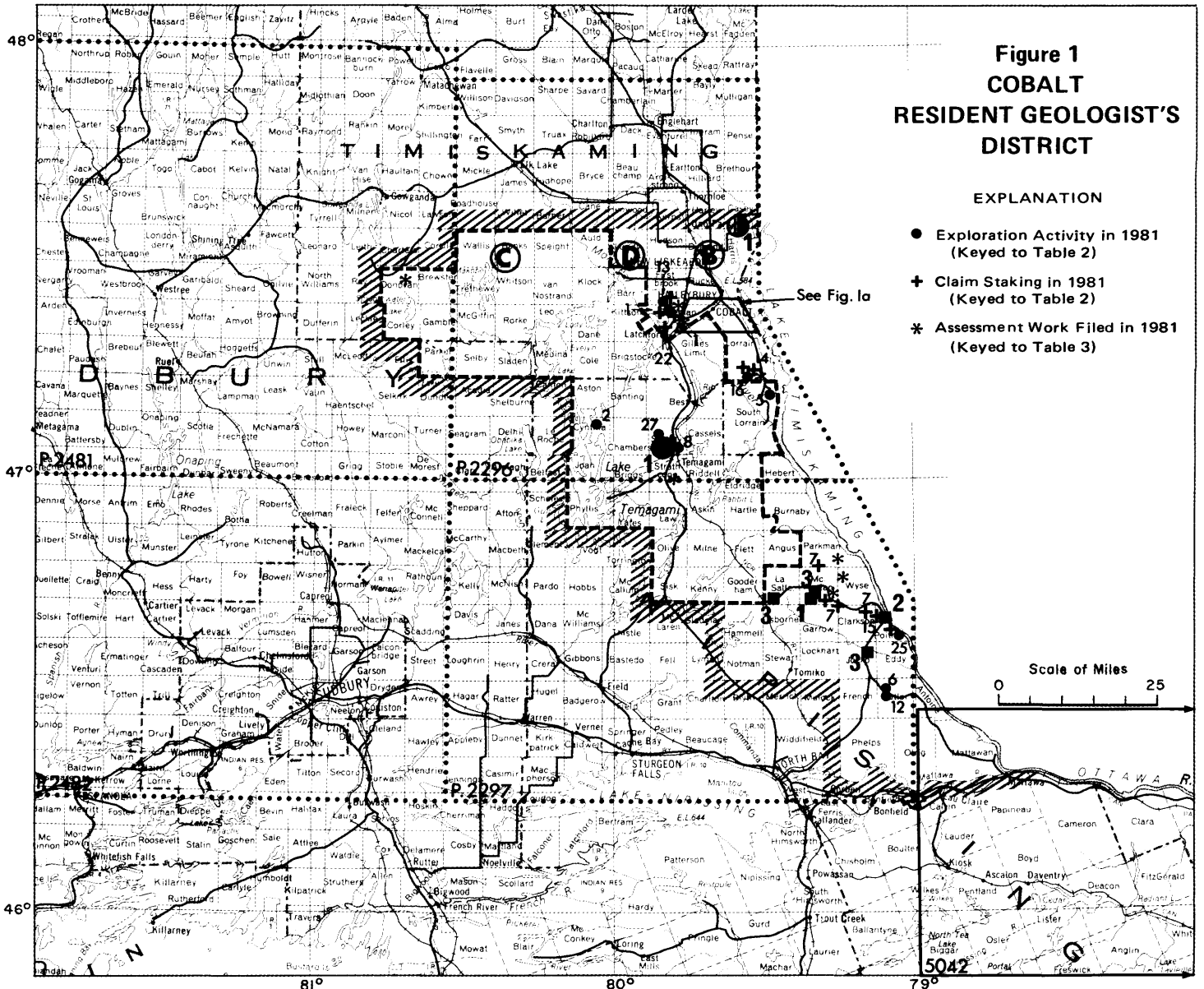
Precambrian Geology Section

A.S. Legun began a detailed stratigraphic study of Huronian sediments in and around Cobalt. Mapping and compilation of data is directed towards establishing the

**Figure 1
COBALT
RESIDENT GEOLOGIST'S
DISTRICT**

EXPLANATION

- Exploration Activity in 1981
(Keyed to Table 2)
- + Claim Staking in 1981
(Keyed to Table 2)
- * Assessment Work Filed in 1981
(Keyed to Table 3)



- **Producing Mines, 1981**
 1. Sherman Mine (Dofasco, Tetapaga Mining Co. Ltd.) Fe
 2. Coniagas-Tretheway Mine (Agnico Eagle Mines Ltd.) Ag
 3. Beaver-Timiskaming Mine (Agnico Eagle Mines Ltd.) Ag
 4. Silverfields Mine (Teck Corporation) Ag
 5. Pan Silver Mine (Pan Continental Mining (Canada)) Ag
- **Mines Under Development, 1981**
 1. Langis Mine (Agnico Eagle Mines Ltd.) Ag
 2. King Edward Mine (Silver Century Explorations Ltd.) Ag
- **Producing Stone Quarries**
 1. McLaren's Bay Mica Stone Quarries
 2. Thorne Brilliant Stone Quarry
 3. G.M. Mote
- ⊗ **Refinery**
 1. Canadian Smelting and Refining Ltd.
 2. Cobalt Refinery Ltd.
- 567 **Mill**
 1. Canadaka Mines Ltd.
 2. Teck Corp. - Con. Summit Mill
 3. Agnico Eagle Mines Ltd.
- (A) (B) (C) **Location of OGS Field Parties in 1981**
- (D) **Location of Resident's Field Mapping in 1981**
- **Map or report issued by the Ontario Geological Survey in 1981**
- //// **Boundary of Resident Geologist's district**
- **Areas withdrawn from staking through Bear Island Indian Caution**

COBALT AREA

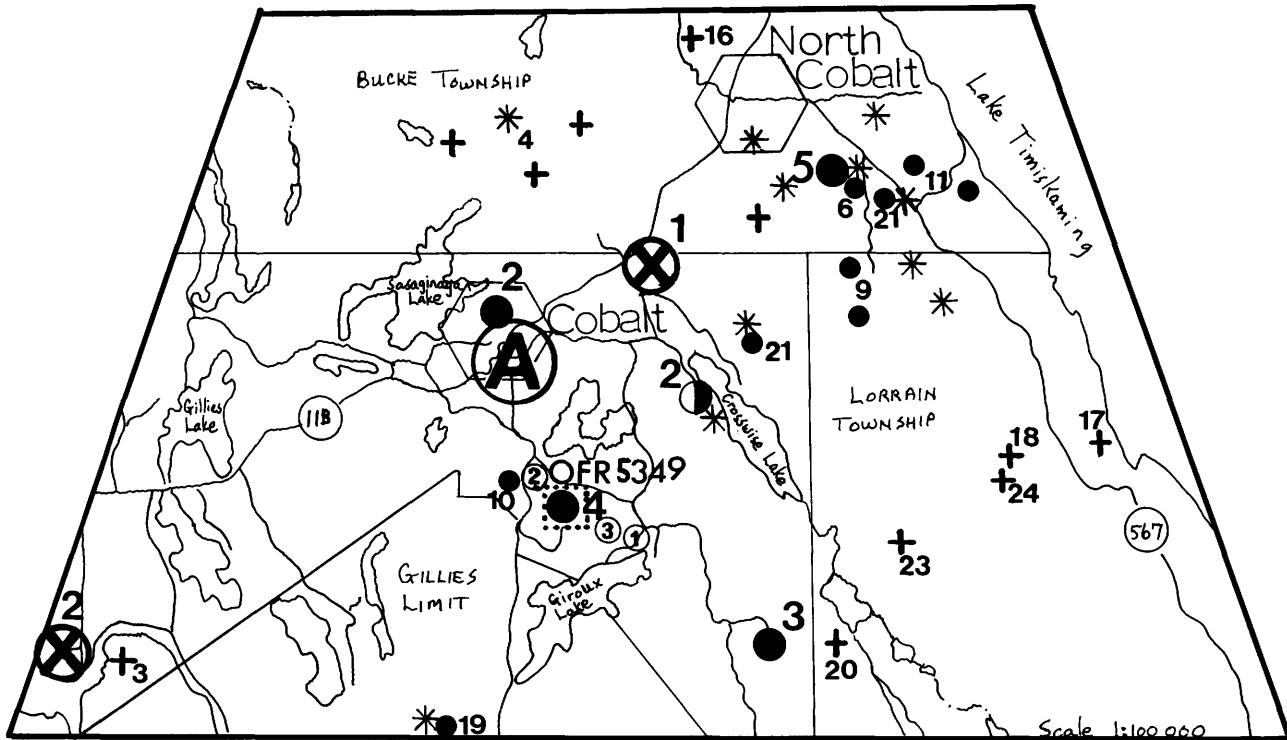


Figure 1a (base map after OGS Map 5024)

TABLE 1 | MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

Ontario Geological Survey Reports

Coloured Maps

2440

Open File Reports

OFR 5329
OFR 5349

Northern Ontario Engineering Geology Terrain Studies Reports

NOEGTS 102

Preliminary Maps - Geological Series

P. 2481

Northern Ontario Engineering Terrain Studies Maps

5042

Preliminary Maps - Data Series

Mineral Resources Branch Publications

MPBP 12

Aggregate Resources Publications

Miscellaneous Reports

MP 95
MP 100
Geological Survey of Canada Open File Reports

Federal - Provincial Maps

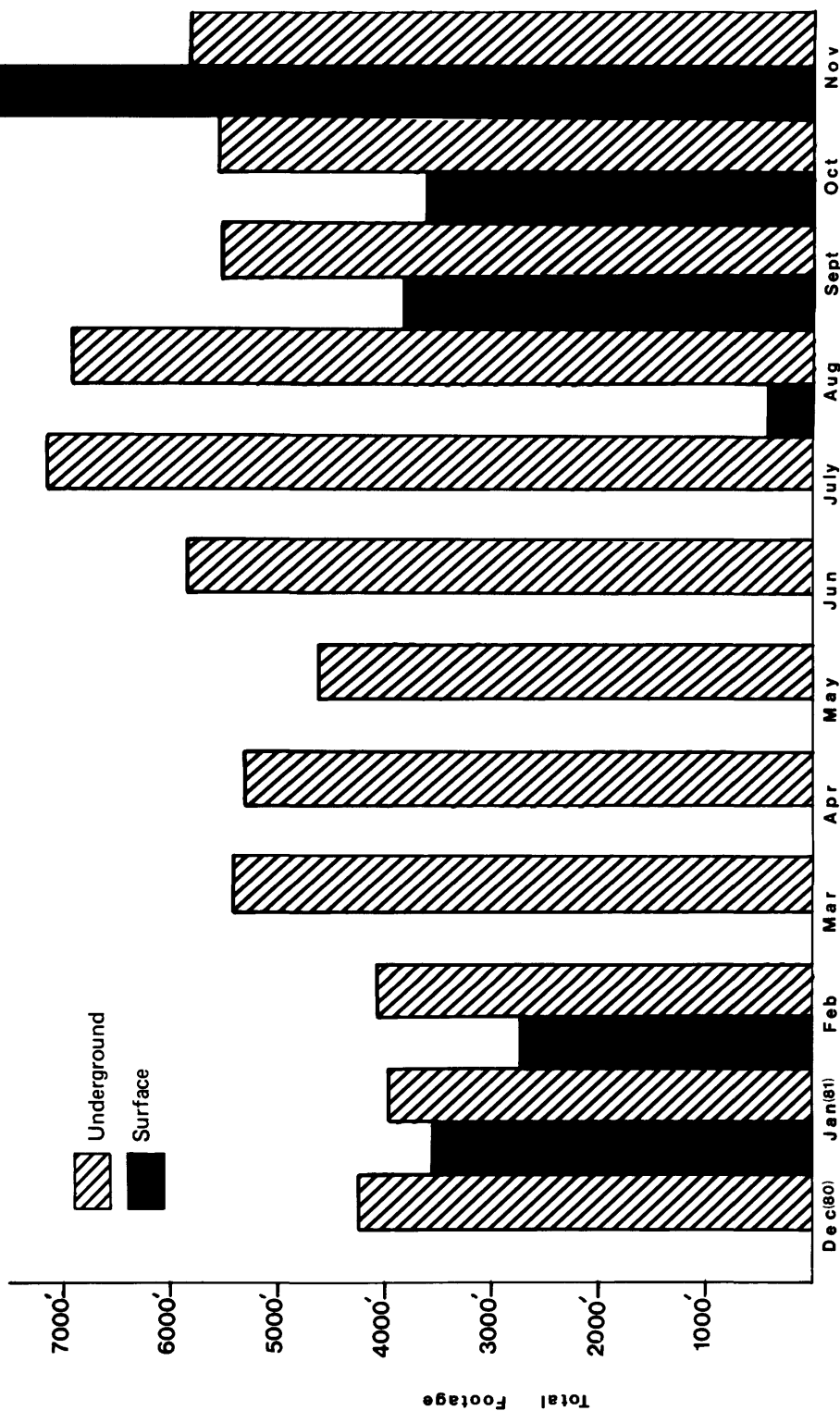


Figure 2 — Exploration diamond drilling activity in the Cobalt Resident's area in 1981.

TABLE 2

EXPLORATION ACTIVITY DURING THE YEAR.

Number on Figure	Individual or Company	Activity
1	Agnico Eagle Mines Ltd.	Claim staking (71), geophysical survey, surface diamond drilling, Coleman Township.
2	Coppersand Exploration Ltd.	Trenching, Cynthia Township.
3	Gilmour Gold Exploration Ltd.	Claim staking (9), Coleman Township.
4	Highland Crow Resources Ltd.	Claim staking (21), Bucke Township.
5	Keely-Frontier Resources	Feasibility study, South Lorrain Township.
6	Pan Continental Mining (Canada)	Surface diamond drilling, Bucke Township.
7	Selco Inc.	Claim staking (52), Clarkson, McAuslan, Wyse, Garrow and Parkman Townships.
8	Sherman Mine	Surface delineation diamond drilling, Strathy Township.
9	Silverside Resources Ltd.	Geophysical survey, surface diamond drilling, Lorrain Township.
10	Teck Corporation-Cons. Summit Mines	Underground exploration diamond drilling, Coleman Township.
11	Teledyne Canada Ltd.	Surface diamond drilling, Bucke Township.
12	Textan Exploration and Mining Ltd.	Trenching, stripping, Butler Township.
13	Benner, R.	Claim staking (14), geophysical survey, Firstbrook and Coleman Townships.
14	Clarke, R.M.	Claim staking (12), trenching, stripping, sampling, Lorrain Township.
15	Foreman, H.W.	Claim staking (5), Clarkson and Poitras Townships.
16	Gilson, R.A.	Claim staking (11), prospecting, Bucke and Lorrain Townships.
17	Greer, P.	Claim staking (3), Lorrain Township.
18	Hall, J.	Claim staking (1), Lorrain Township.
19	Home, K.	Deepening shaft, prospecting, Gillies Limit.
20	Maicella, G.F.	Claim staking (5), Lorrain Township.
21	Malouf, S.M.	Geophysical survey, surface diamond drilling, Bucke and Coleman Townships.
22	Moore, R.A.	Claim staking (1), Coleman Township.
23	McAllister, R.C.	Claim staking (3), prospecting, trenching, Lorrain Township.
24	McCullough, W.	Claim staking (3), prospecting, Lorrain Township.
25	McLean, P.C.	Claim staking (25), Poitras Township.
26	Rocheleau, J.	Trenching, Butler Township.
27	Shimbashi, W.	Acquired 6 claim block, Strathy Township.

NORTHEASTERN — COBALT

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SUDBURY MINING DIVISION

SYMBOLS AND ABBREVIATIONS

Au-gold	D-Donated by Company or Individual	GL-Geological Survey	SA-Sampling, Assays
Ag-silver	DD-Diamond Drilling (Numbers	Mag-Magnetometer Survey	STr-Stripping
Fe-iron	following "DD" indicate number	MEAP-Mineral Exploration	Twp-Township
Si-silica	of holes drilled & total length	Assistance Program	Tr-Trenching
Assess-Assessment Work	respectively)	OSC- Ontario Securities	sTr-Soil Trenching
BM-Base Metal	EM-Electromagnetic Survey	Commission	rTr-Rock Trenching
BS-Beneficiation Studies	Geochem-Geochemical Survey	Pros-Prospectus	VLF-Very Low Frequency

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Bucke Twp.		Armstrong, Marvin	Ag	Assess	DD 1-200	1980	--	
Bucke Twp.		Malouf, Stanley M.	Ag	Assess	VLF, Mag	1980	2.3704	
Bucke Twp.		Malouf, Stanley M.	Ag	Assess	VLF, Mag, DD 1-203	1980, 1981	2.3733	
Bucke Twp.		Pan Silver Mine	Ag	D	DD 25-5517	1981	--	
Bucke Twp.		Teck Explorations Ltd.	Ag	Assess	VLF, Mag, GL	1980	2.3417	
Coleman Twp.		Armstrong, James E.	Ag	Assess	DD 3-1504	1980	--	
Coleman Twp.		Malouf, Stanley M.	Ag	Assess	Mag, DD 1-602	1981	2.3733	
Coleman Twp.		Silver Century Explorations	Ag	D	DD 14-4960	1981	--	
Coleman Twp.		Silver Century Explorations	Ag	Pros	OSC	1980	63.3829	
Coleman Twp.		St. Joseph Explorations Ltd.	Ag,BM	Assess	EM, Mag, GL	1980	2.3780	
Donovan Twp.		Brady, J.G.	Ag	MEAP CG-168	rTr, STr, SA, sTr	1980	63.3793	
Gillies Limit		Home, Kendall P.	Ag	Assess	Manual shaft sinking	1981	--	
Lorrain Twp.		Armstrong, James E.	Ag	Assess	DD 1-202	1980	--	
Lorrain Twp.		Clarke, Ronald M.	Au,Ag,BM	Assess	rTr, VLF, SA, STr, GL	1981	--	
Lorrain Twp.		Malouf, Stanley M.	Ag	Assess	VLF, Mag	1980	2.3733	
McAuslan Twp.		Haberer, Joseph	--	Assess	rTr	1980	--	
Parkman Twp.		Mortimer, Charles	--	Assess	rTr, DD 5-537	1980	--	
Strathcona Twp.		St. Joseph Explorations Ltd.	BM,Au	Assess	EM, Soil Geochem	1980	--	
Strathy Twp.		Sherman Mine (Turtle Lake Deposit)	Fe	D	DD 14-6304 DD 10-4048 DD 18-6548 DD 7-3031	1981 1979 1978 1977	-- -- -- --	
Wyse Twp.		Haberer, Joseph	Si	Assess	BS, SA, GL	1979	--	

depositional environment of the Coleman Member sediments and the topography of the Archean basement and its relationship to sedimentation (Legun 1981).

Mineral Deposits Section

A.C. Colvine initiated a regional reconnaissance sampling program for paleoplacer gold in Lorrain Formation sediments in the northern half of the Cobalt Embayment (Colvine 1981). Similarities between the geology of this area and the major gold producing Witwatersrand (Praetorius 1976) of South Africa indicate that similar gold concentrating processes may have been active in some parts of the basin.

D.G.F. Long studied the rocks in the southern half of the Cobalt Embayment and attempted to establish a relationship between gold content in Huronian sediments and specific macroenvironments (Long 1981). The object was to relate sedimentary structures or lithological characteristics to gold content and use these relationships as an exploration tool.

Leo Owsiacki mapped in detail the southern half of Lundy Township (Owsiacki 1981), and established the structure, stratigraphy, and mineral potential of the area. A reconnaissance radiometric survey and detailed sampling combined with trace element analyses and the geology provide the basis for location of potential exploration targets.

Geophysics/Geochemistry Section

A gravity study including the Cobalt Resident's District is nearing completion. Final maps have been published, and interpretation of data is presently well underway (Gupta 1981).

Engineering and Terrain Geology Section

D.J. Russell studied the stratigraphy and structure controlling the Paleozoic outlier near Lake Temiskaming. This study was part of a province-wide program aimed at correlating these outliers with "main" basins and defining their aerial extent (Russell 1981).

Recommendations for Exploration

At prices greater than \$400 U.S., the potential for the presence of economic deposits of gold in the area is quite high. An Archean "greenstone belt" in the Temagami area contains numerous old gold occurrences. Gold values are normally present in a variety of vein-type assemblages. Visible gold found in veinlets within the iron formation at the Sherman Mine suggests a possible relationship to this horizon.

Recent reconnaissance sampling programs which have been undertaken in the Cobalt Embayment by

various groups, have indicated that gold values substantially above background are present in the Huronian sediments. Exploration for sedimentological features known to concentrate gold in fluvial systems may aid future discoveries.

At elevated prices, the platinoid minerals represent a possible exploration target in the Temagami area where numerous ultramafic bodies are exposed. Both nickel and platinum values have been obtained from some of these outcrops.

Although the areas described are favourable for exploration, most occur within the boundaries of the Bear Island Indian Caution (Figure 1). At the present time, no staking is allowed until land claims are settled.

Of the townships open to staking, the recently mapped south half of Lundy Township presents three relatively attractive silver exploration targets. Two strong quartz-carbonate vein structures were discovered in Nipissing Diabase in the southwest and east sills. Both contained chalcopyrite mineralization and are similar to some silver-bearing veins in the Gowganda area.

The east side of the township is characterized by a major antiform structure as outlined by Huronian sediments. This structure, cut by a Nipissing diabase sill, may represent a draping effect of the sediments over a buried Archean ridge. Stratigraphically, the sediments centered over the antiform occur below the Coleman member conglomerate, and suggest the Archean basement may be very near surface in some locations. Recent exploration in the Cobalt area has been based on the close relationship of Archean interflow sediments to a system of intersecting high grade silver veins. The possibility exists that Archean volcanics and associated interflow sediments are present near to surface and are intruded by a diabase sill. These features together provide a possible loci for silver mineralization.

Outcrop exposed south of Lundy Lake contains rock units which may be Archean in age. In one instance, laminated argillites of the Firstbrook Formation are in contact with a fine-grained mafic rock characterized by intense epidote veining and the presence of trace Cu. These rocks in turn contact an unidentified clast supported breccia unlike any previously observed in the camp. In addition, the argillites commonly contain chloritic alteration spots. This feature is often observed in the vicinity of silver veins in the Cobalt area (Appleyard 1981) and may be an indicator of ore forming processes (Thomson 1965, Jambor 1971). The exact nature and origin of these lithologies is presently under more detailed investigation. If an Archean age can be established for these rocks, the nearby presence of the Nipissing Diabase would indicate a favourable area for further exploration.

Potential for as yet undiscovered silver deposits in the Cobalt area remains high, but the lack of a good exploration tool hinders lower cost programs. Neither geophysics nor geochemistry (Boyle 1969) has proved itself in the area. At present, geological concepts, a thorough knowledge of the local structure, and diamond drilling are best utilized in planning exploration work.

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1981 Report of the Sault Ste. Marie Resident Geologist

Gerald Bennett¹

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¹Resident Geologist, Ontario Ministry of Natural Resources, Sault Ste Marie.

Introduction

The number of claims recorded increased slightly over the 1980 figure. Most of the mineral exploration in the Sault Ste. Marie Mining Division was carried out in the Michipicoten "Greenstone" Belt which extends eastward from Lake Superior to Missinabie Lake.

The successful exploration for gold in the Hemlo area by Corona Resources Limited was an exciting development in 1981, and holds promise for further exploration in that area.

Renabie Mines Limited, a former gold producer in the Missinabie area, began production in late 1981.

Resident Geologist's Activities

The staff in the Sault Ste. Marie office consists of: E.J. Leahy, Resource Geologist; Lorry J. Ashick, geological assistant; and Gerald Bennett, Resident Geologist. Mrs. G. Nivins, who acted as secretary to the Resident Geologist since the Sault Ste. Marie office opened in 1962, retired in July. Mrs. Brenda Fremlin joined the staff as secretary in October.

In May of 1981, the Resident Geologist led a field trip for mining and university geologists through the Huronian Supergroup of the Sault Ste. Marie and Thessalon areas. A fifty page field trip guidebook was prepared for the Institute on Lake Superior Geology. Copies of this are available from this office.

During the summer of 1981, the Resident Geologist visited 12 active properties, 37 mineral occurrences, and three operating mines. Many of the visits to inactive mineral occurrences were made accompanying District Lands Technicians, Ontario Ministry of Natural Resources, and the Ontario Ministry of Labour Safety Engineer in order to inspect potentially hazardous openings on inactive mining properties. The function of the Resident Geologist during these visits is to insure that potentially useful exploration shafts were not filled and made otherwise inaccessible for any future exploration program.

About two weeks were spent mapping the eastern half of Hughes Township. A brief description of the results of this mapping is included in this report.

TABLE 1 MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

<u>Ontario Geological Survey Reports</u>	<u>Coloured Maps</u>
GR 205	2452
	2444
<u>Open File Reports</u>	<u>Northern Ontario Engineering Geology Terrain Studies Reports</u>
OFR 5330 OFR 5350	
OFR 5342 OFR 5352	
OFR 5345	
<u>Preliminary Maps - Geological Series</u>	<u>Northern Ontario Engineering Terrain Studies Maps</u>
P. 2406	
<u>Preliminary Maps - Data Series</u>	<u>Mineral Resources Branch Publications</u>
<u>Aggregate Resources Publications</u>	<u>Miscellaneous Reports</u>
<u>Federal - Provincial Maps</u>	<u>Geological Survey of Canada Open File Reports</u>
	OFR 746

Additional geological mapping was carried out in the Sault Ste. Marie and Elliot Lake areas.

Five days were spent with Dr. F. Corfu of the Royal Ontario Museum collecting rock samples for the radiometric age dating of Huronian volcanic rocks.

A report was prepared for the Ontario Ministry of Transportation and Communications pertaining to radioactivity within the Matinenda Formation along Highway 108 near the town of Elliot Lake.

The major part of the Resource Geologist's time was spent preparing a format for presenting and distributing a summary of data available at the Resident Geologist's Office. This format, which will consist of a series of compilation maps and information sheets, will be known as a Geological Data Inventory Folio, and it is designed to replace the Data Series Maps. The design of this publication is now in the final stages.

The Sault Ste. Marie office was chosen as the pilot office for the installation of a microfiche assessment file system. Much of the Resource Geologist's time and that of the Geological Assistant was spent preparing files for shipment, reassembling files, and scanning microfiche for errors and omissions.

The Resource Geologist visited the Corona Resources Limited deposit in the Hemlo area and made a brief reconnaissance survey of the geology along Highway 631. The bedrock geology in the vicinity of lakes bearing anomalous amounts of uranium in waters and lake sediments (Ontario Geological Survey—Geological Survey of Canada) was examined in a reconnaissance manner. The uranium anomalies are caused by above background uranium contents in pegmatitic phases of the granitic country rocks.

Data on known hematite occurrences in the Algoma District was researched and several specular hematite deposits were examined in the field by the Resource Geologist.

The Resource Geologist spent a total of 34 days working in the field and attending meetings. The Resident Geologist spent about 65 days doing similar activities. The remainder of the staff's time was spent responding to inquiries from the public and government agencies and carrying out routine office duties.

Mr. J. Kral and R. Beith were hired as student assistants during the field season. Under the direction of Mr. Kral and the Resident Geologist, core racks sufficient to store 1200 boxes of core, were constructed in the Ontario Ministry of Natural Resources warehouse in Sault Ste. Marie.

Mining Activity

The Algoma Ore Division of the Algoma Steel Corporation Limited continued production of iron ore at Wawa, providing 1 337 977 tons of sinter from January 1 to November 30, 1981 (source: Algoma Ore Division, Wawa, Ontario).

Denison Mines Limited and Rio Algom Mines Limited continued their expanded production of uranium oxide at Elliot Lake. The Panel Mine of Rio Algom Mines Limited has been brought back into full production with a capacity of 3 300 tons per day (Northern Miner, November 26, 1981).

Renable Mines Limited, a former gold producer in Leeson Township, has been reopened and initial production is getting under way.

There was limited production of lead-silver concentrates from the property of Prace Mining Limited in Van-koughnet Township. The property is being reevaluated with the possibility of further production being undertaken in the spring of 1982.

Exploration Activity

In recent years the focus of exploration activity in the Sault Ste. Marie Mining Division has been on gold and silver, while the exploration for uranium continued to decline.

Between January 1, 1981 and December 7, a total of 1373 mining claims were staked in the Sault Ste. Marie Mining Division. Although this is an increase over the 1243 claims staked in 1980, the large number of claims staked in the Hemlo area as a result of the Corona Resources Limited find, suggests that the total number of claims staked in the traditional areas of Michipicoten and Elliot Lake-Blind River was less than in 1980.

In the Michipicoten greenstone belt, most of the exploration activity has been taking place on patented claims covering old prospects or past producers.

Gold and Silver

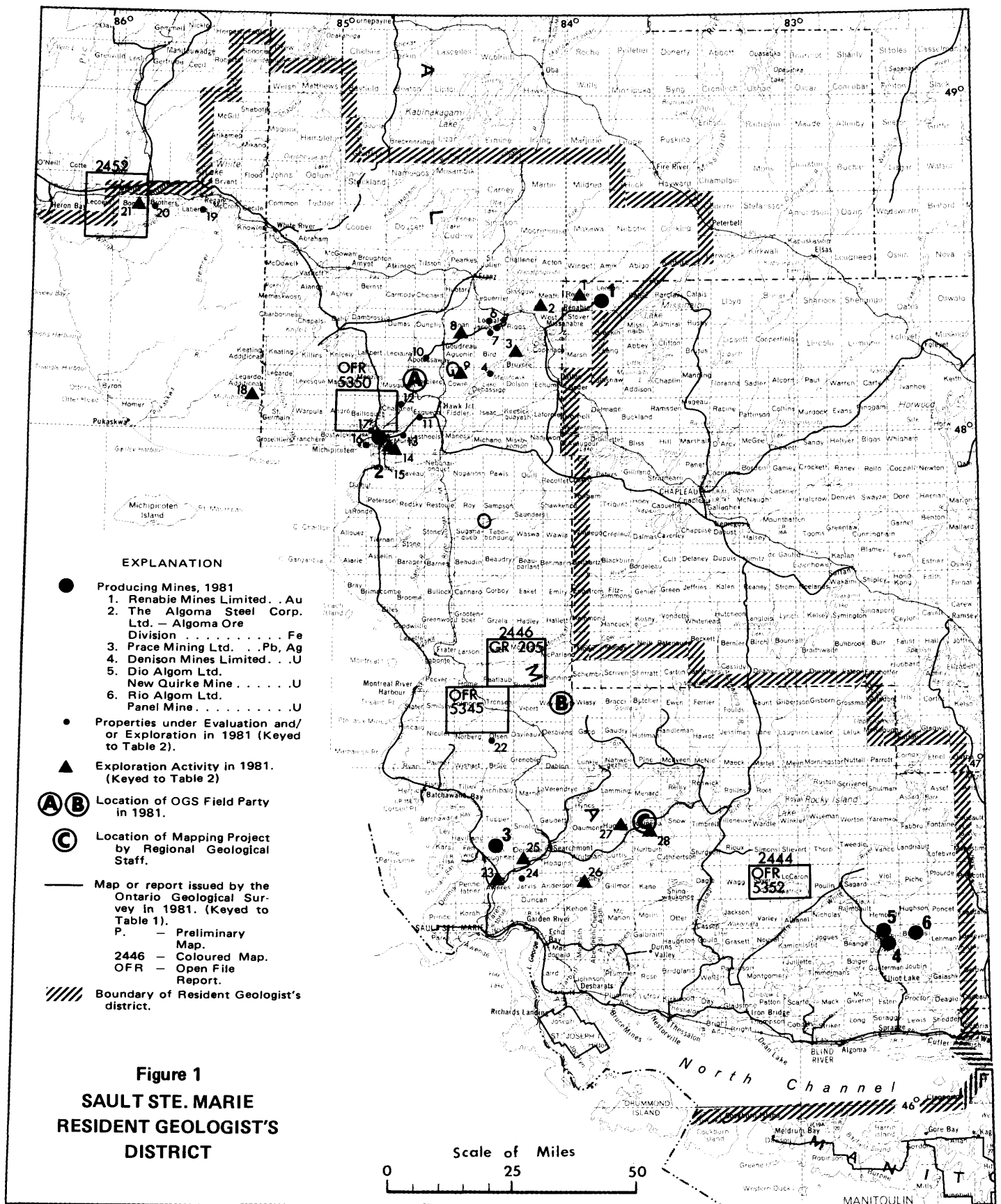
Much of the exploration for gold and silver in the Michipicoten area is taking place in the vicinity of old past producers.

In McMurray Township, near Wawa, Dunraine Mines Limited continued exploration on the properties of the Parkhill, Darwin, and VanSickle Mines, which were acquired by Dunraine Mines Limited in 1979 and 1980.

The Parkhill Mine was dewatered to below the second level. About 1500 m of diamond drilling was put down along the Darwin Shear on previously unexplored ground.

A related company, J.Q. Resources Limited, began line cutting and reconnaissance geology in Esquega Township.

Amax of Canada Limited continued work on the old Alden-Goudreau Gold Mine near Forge Lake in Cowie Township in the Goudreau area. About 3000 m of diamond drilling was completed, and considerable stripping and sampling were done. The property is still under evaluation.



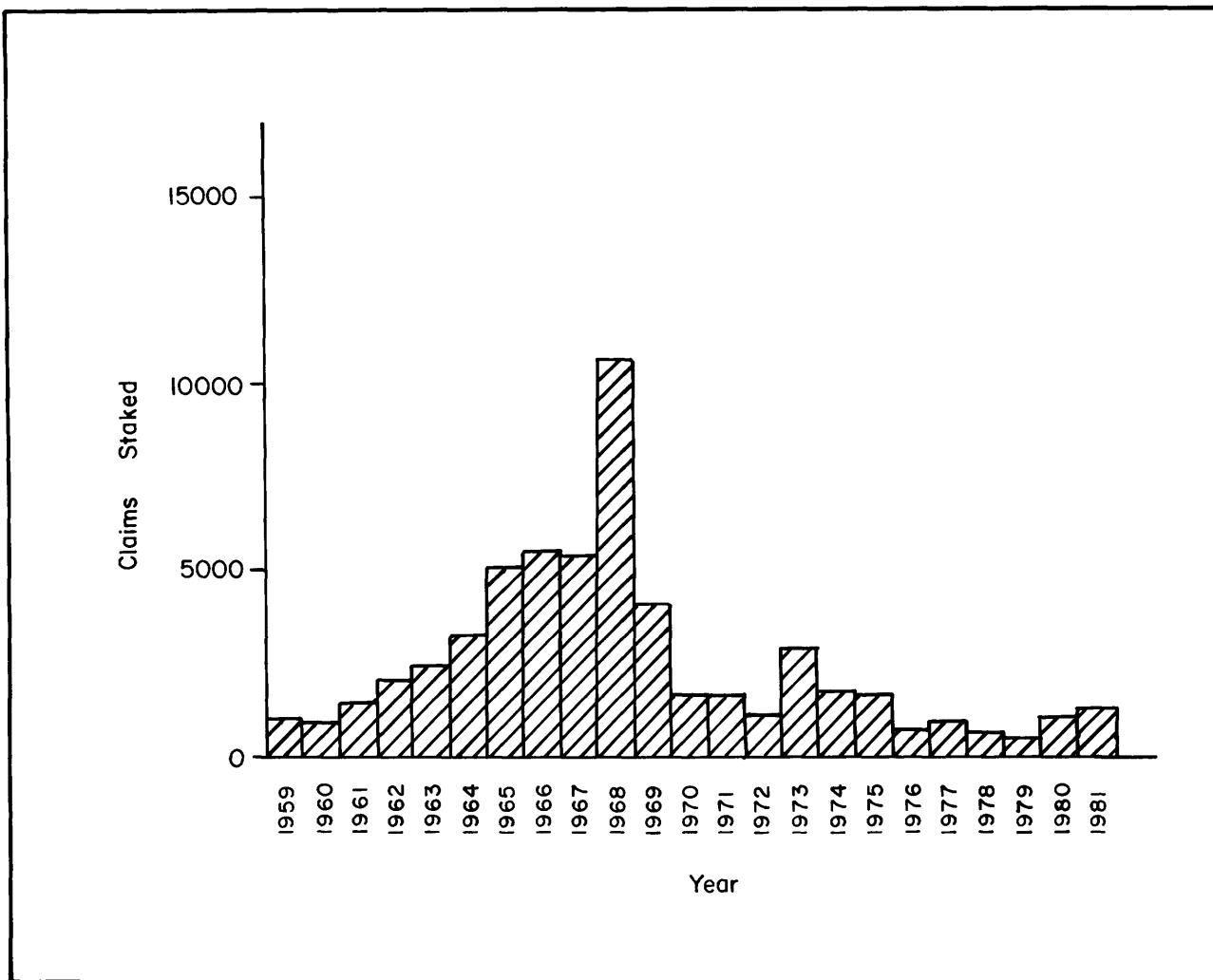


Figure 2 Number of claims staked in the Sault Ste. Marie Mining Division from 1959 to (Dec. 1) 1981.

Westfield Minerals Limited completed work on its Conboy Lake silver-zinc property in Rennie Township during the summer of 1981. Diamond drilling, geological and geochemical programs were carried out on that property in 1980 and 1981.

Westfield Minerals Limited acquired an interest in the gold property of St. Fabien Explorations Incorporated near Mishibishu Lake. In the fall of 1981, Westfield Minerals Limited carried out preliminary geological mapping and trenching, and sampling. Work is to continue in the spring of 1982.

Kingswood Explorations Limited is continuing exploration of a gold property in Bruyere Township. In 1981, 1350 m of diamond drilling was done, along with detailed geological mapping and a basal-till geochemical survey. The consulting geologists reported that gold occurs along the contact between a vesicular flow and a metagabbro with the best values occurring within the vesicular flow.

The Algoma Summit Mines (also known as the Magino Mine) in Finan Township was acquired by McNellen Resources Limited (formerly Rico Copper Limited) in 1981. McNellen Resources Limited carried out a dia-

mond drilling program on the property in 1981 and is presently dewatering the old workings in preparation for underground exploration and development.

The successful exploration of Corona Resources Limited in the Hemlo area has provided the impetus for gold exploration by other companies in the area¹.

Little Long Lac Gold Mines Limited have staked a large block of claims in Brothers, Laberge, and McCron Townships east of the Corona ground. Little Long Lac Gold Mines Limited has completed airborne magnetometer and electromagnetometer surveys and reconnaissance geological and geochemical surveys. More extensive detailed exploration is being planned.

Prospectors were active in the Sault Ste. Marie-Ranger Lake lead-silver area in 1981.

Algoma Silver-Lead Limited, a Sault Ste. Marie based group, carried out surface work and bulk sampling on seven argentiferous galena-sphalerite veins in Deroche Township. In late November, 1981, an agreement

¹For a description of the Corona Resources Limited activity, see the 1981 report of the Resident Geologist, North Central Region.

TABLE 2

EXPLORATION ACTIVITY DURING THE YEAR.

Number on Figure	Individual or Company	Activity
1.	Westfield Minerals Limited	Geochemical survey, geophysical survey, drilling, Rennie Township
2.	Cut Thumb Explorations Limited	Sampling, trenching, West Township
3.	Kingswood Explorations Limited	Drilling, geological mapping, geochemical survey, Bruyere Township
4.	The Algoma Steel Corporation Limited	Magnetometer survey, Debassige Township
5.	Vega Gold Limited	Drilling, Jacobson Township
6.	Cymbal Explorations Limited	Geological mapping, Jacobson Township
7.	Prospection Limited	I.P. survey, drilling, Jacobson Township
8.	McNellen Resources Limited	Drilling, sampling, Finan Township
9.	Amax Limited	Drilling, stripping, sampling, Cowie Township
10.	Riocanex	Geological mapping, sampling, drilling, Abotossaway Township
11.	J.Q. Resources Limited	Line cutting, reconnaissance geology, Esquega Township
12.	The Algoma Steel Corporation Limited	Drilling, Chabanel Township
13.	The Algoma Steel Corporation Limited	Drilling, McMurray Township
14.	Dunraine Mines Limited	Drilling, geological mapping, sampling, dewatering shaft, McMurray Township
15.	Pango Gold Mines Limited	Drilling, McMurray Township
16.	The Algoma Steel Corporation Limited	Drilling, Lendrum Township
17.	The Algoma Steel Corporation Limited	Drilling, Lendrum and Bailloquet Townships
18.	Westfield Minerals Limited	Geological mapping, trenching, sampling, Mishibishu Lake area
19.	Little Long Lac Gold Mines Limited	Reconnaissance geological, geophysical and geochemical surveys, Brothers and Laberge Townships
20.	Goliath Gold Mines Limited	Staking, Bomby Township
21.	Corona Resources Limited	Staking, drilling, Bomby Township (see Resident Geologist's report for North Central Region)
22.	Teck Corporation Limited	Drilling, Olsen Township
23.	Highland Crow Resources Limited	Geological mapping, sampling, Aweres Township
24.	R. Paynter	Drilling, Jarvis Township
25.	Algoma Silver-Lead Limited	Sampling, trenching, Deroche Township
26.	Haugeneder, J.	Drilling, Chesley Township
27.	S, Powley and Associates	Drilling, sampling, Hughes Township
28.	Watts, Griffis & McOuat	Trenching, sampling, Jollineau Township

was made with McNellen Resources Limited to continue work on the property.

At the same time, McNellen Resources Limited made an agreement with the Elsa Don Syndicate to resume work on an argentiferous galena vein in Hughes Township.

In the fall of 1981, local prospectors discovered a new argentiferous galena-sphalerite vein in northeast Hughes Township. This is the first new discovery in that area in many decades, and led to the optioning of the property by INCO Limited.

Base Metals

Exploration for base metals was again on the decline in the Sault Ste. Marie Mining Division in 1981. This is largely a reflection of the relatively low copper prices.

Highland-Crow Resources Limited optioned a copper prospect in Aweres Township near Sault Ste. Marie. Some reconnaissance geological mapping and sampling was carried out in 1981.

Algoma Steel Limited continued exploration for base metals in the Wawa area. Most of the company's work consisted of diamond drilling anomalies that had been located by airborne and ground geophysical surveys conducted in 1980.

Geology and Mineral Deposits of Part of Hughes Township

Fourteen days were spent carrying out geological mapping in the eastern half of Hughes Township. The author was assisted by Mr. J. Kral and Mr. R. Beith. Mr Kral was responsible for part of the mapping.

Hughes Township forms part of the Sault Ste. Marie lead-silver area and the general geology is described by M.E. Hurst (1928).

Early Precambrian Rocks

Hughes Township is underlain predominantly by Early Precambrian gneissic tonalite and migmatite. The latter is essentially gneissic tonalite with varying amounts of amphibolite paleosome and leuco-pegmatite neosome.

A wedge-shaped belt of pink equigranular and porphyritic, medium- to coarse-grained quartz monzonite extends in an approximately east-west direction across the northeast corner of Hughes Township.

Four narrow units of amphibolite (mafic metavolcanics) occur within the quartz monzonite. M.E. Hurst (1928) indicated that the quartz monzonite is part of a larger mass underlying much of Jollineau and Snow Townships which adjoin Hughes Township to the east.

Dark grey to brownish grey weathering diabase dikes are by far the most common dike rocks of the area.

Dike Rocks

An attempt was made to subdivide the diabase dikes by measuring the total gamma radiation (as an indication of the potash content) and the magnetic susceptibility using a pocket magnetometer and small magnet. It was generally found that a few diabase dikes exhibit a relatively high total gamma radiation and are also relatively magnetic. These two characteristics generally corresponded to a lower apparent degree of metamorphism, and it was concluded that these dikes were of Keweenawan age. Since geological relationships or absolute ages are not available, this subdivision must be considered tentative.

Pink and orange weathering, fine-grained felsic (felsite) dikes were noted at nine locations in the area mapped. These dikes are from less than 1 m to over 5 m wide, and consist almost entirely of pink to red potassium feldspar. A few felsite dikes are amygdaloidal and contain disseminated pyrite. These rocks have a distinctive appearance and are known to intrude Keweenawan lavas and to be of Keweenawan age.

Seven occurrences of lamprophyre are known in the area mapped. These are mostly small dikes approximately 1 m wide; however one is at least 5 m wide and may be a small plug or pipe.

The lamprophyres are grey weathering rocks that have a very dark grey to black fresh surface. These rocks are characterized by well-developed euhedral hornblende phenocrysts up to 5 cm long. The matrix is a very fine grained mixture of biotite and plagioclase. Six of the lamprophyre bodies contain abundant corroded xenocrysts of quartz and feldspar, and inclusions of granitic country rocks. Two lamprophyres contain inclusions of pink Keweenawan felsite indicating that the lamprophyres are Keweenawan or younger in age.

Economic Geology

Four areas of mineralization known within the area are shown on Figure 3 of this report. Occurrence (1), known as the Conway deposit, was discovered in 1926. At about that time considerable surface work was done. The mineralization consists of lenses and veins of argentiferous galena with minor sphalerite, and pyrite. The widths vary from a few centimetres to over 30 cm over a known length of 50 m (Hurst 1928).

The galena occurs along a narrow lamprophyre dike within brecciated and altered west-northwest trending diabase. A report in the Resident Geologist's files stated that grab samples contain up to 17 ounces of silver per ton.

The property is now held by the Elsa Don Syndicate of Sault Ste. Marie. An agreement has recently been made between the Elsa Don Syndicate and McNellen Resources Limited to carry out further exploration including a diamond-drill program.

The Powley-Campbell showing (2 on Figure 3) is in part a small pit in a quartz ankerite vein. The vein contains variable amounts of chalcopyrite, sphalerite, galena, and pyrite. Grab samples from this pit were analyzed by the Geoscience Laboratories of the Ontario Geological Survey and were found to contain up to 10 ounces of silver per ton and up to 69 percent lead. One sample containing 1.47 percent lead was found to contain 9.87 ounces of silver per ton and 4.5 percent bismuth, indicating the presence of an unidentified argentiferous sulfosalt. It is not possible from this pit to gain much information about the extent or attitude of the mineralization.

On a hill immediately south of the pit, two brecciated felsite dikes, each a few metres wide, are separated by an area of quartz veined and brecciated gneissic granite. An adjacent lamprophyre body contains blocks of granitic rocks and Keweenawan felsite.

About (1000 m) north of the mineralized pit, old trenching turned up blocks of coarse calcite with traces of chalcopyrite and fluorite.

In the fall of 1981 prospectors S. Powley and C. Campbell discovered an occurrence of argentiferous galena and sphalerite in a creek bed (3 on Figure 3) about 600 m south of the showing described above. The mineralization occurs in a quartz vein in diabase and adjacent to a felsite dike. The water level prevented a detailed examination of the occurrence by the author, but a grab sample by the author contained 13.3 ounces of silver per ton and 8.27 ounces of silver per ton, with 0.12 and 0.01 ounces of gold per ton respectively (assays by Geoscience Laboratories, Ontario Geological Survey).

The Powley-Campbell claims have recently been optioned by INCO Limited.

Two mineralized felsite dikes are 1 to 4 m wide, and are located in the south part of the area mapped in 1981 (4 on Figure 3). These dikes were found in 1980 by D. Dolan, a local prospector. The visible sulfide minerals are pyrite with minor chalcopyrite. Assays by the Geos-

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TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.
SAULT STE. MARIE MINING DIVISION

Abbreviations

A	-Airborne Survey	EM	-Electromagnetic Survey
AEM	-Airborne Electromagnetic Survey	G	-Ground Survey
AMag	-Airborne Magnetometer Survey	GL	-Geological Survey
Ag	-Silver	IP	-Induced Polarization Survey
Au	-Gold	Mag	-Magnetometer Survey
Co	-Cobalt	Pb	-Lead
Cu	-Copper	Rad	-Radiometric Survey
D	-Donated by Company or Individual	SA	-Sampling, Assays
DD	-Diamond Drilling	STR	-Stripping
DDH	-Diamond - Drill Hole	VLF	-Very Low Frequency

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Abotossaway	42C/2	Riocanex Inc., Eastern Canada Office	Au	Assess.	1 DDH (197')	1981	-	-
Bailloquet	41N/15 42C/2	The Algoma Steel Corp. Ltd.	Cu,Pb,Zn, Au, Ag,	Assess.	1 DDH (703')	1981	-	-
Bouck	41J/7	Rupert, Roy	U	Assess.	GL	1980	2.3462	SSM 2129
Chabanel	42C/2	The Algoma Steel Corp. Ltd.	Cu,Pb,Zn	Assess.	1 DDH (82.5')	1981	-	-
Chesley	42J/12	Haugeneder, John	Cu	Assess.	1 DDH (34')	1981	-	SSM 2147
Common	42C/11	Sperle, Kasper	U	Assess.	Rad	1979	2.3200	SSM 2124
Debassige	42C/1	The Algoma Steel Corp. Ltd.	Pb,Zn,Cu	Assess	Mag	1981	-	-
Echum	42C/1	Noranda Exploration Company Limited	Au	Assess.	EM & Mag	1980	-	-
Esquega	42C/2	Belyea Syndicate	-	D	7 DDH (2512.1')	1964	-	SSM 2121
Grzela	41N/8	Phaeton Exploration Ltd.	U	Assess.	ARad	1980	2.3360	SSM 2133
Gunterman	41J/7	Rupert, Roy	U	Assess.	GL	1980	2.3462	SSM 2129
Hadley	41N/8	Phaeton Exploration Ltd.	U	Assess.	ARad	1980	2.3360	SSM 2133
Hughes	41J/13	Powley, Steve	Pb,Ag	Assess.	1 DDH (40')	1981	-	-
Jacobson	42C/8	Cymbal Explorations Inc.	Au	Assess.	GL	1981	-	-
Jacobson	42C/8	Potvin, Jean Charles	Au	Assess.	Mag	1980	-	-
Jacobson	42C/8	Prospection Ltd.	Au	Assess.	Mag,IP & GL 9 DDH (2164.9')	1981	2.3585	SSM 2138
Jacobson	42C/8	Shaynee Consolidated Mines Ltd.	-	Assess.	GVLf	1980	2.3449	SSM 352
Jacobson	42C/8	Vega Gold Explorations Ltd.	Au	Assess.	VLF,EM, GL,GEM,GMag	1981	2.3436 2.3411 - 2.3415 inc.	SSM 2122
Jarvis	41K/9	Paynter, Richard	-	Assess.	3 DDH (766')	1981	-	-
Jocelyn	41L/4	Lacana Mining Corp. Rogers, David P.Ltd.	-	Assess.	2 DDH (1783')	1980	-	SSM 2151
Jogues	41J/7	Cominco Ltd.	Cu,Pb,Zn, Au,Ag	Assess.	1 DDh (101')	1981	-	SSM 1552
Joubin	41J/7	North American Nuclear Ltd.	U	Assess.	1 DDH (210')	1980	-	SSM 2045
Kamichisitit	41J/6	Garrelts, James E.	-	Assess.	GL	1979	2.3291	SSM 1709
Larson	41N/8	Phaeton Exploration Limited	U	Assess.	ARad	1980	2.3360	SSM 2133
Leeson	42B/5	Conigas Mines Ltd.	Au	Assess.	5 DDH	1980	-	SSM 1726
Lendrum	41N/15 42C/2	The Algoma Steel Corp. Ltd.	Pb,Zn, Au,Ag,Cu	Assess.	5 DDH (2044')	1981	2.3827 2.3627 2.3721 2.3556	SSM 2134
Loach	41N/8	Phaeton Exploration Limited	U	Assess.	ARad	1980	2.3360	SSM 2133

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McMurray	41N/15	The Algoma Steel Corp. Ltd.	Au,Ag, Cu,Pb,Zn,	Assess.	2 DDH (498.5') GL,SA	1981	-	-
McMurray	41N/15	Golden Goose Gold Mine Ltd.	Au	Assess.	GL,GMag,VLF, EM	1980	2.3503 2.3494	SSM 2127
McMurray	41N/15	Pango Gold Mines Ltd.	Au	Assess.	3 DDH (700')	1981	-	SSM 1650
McMurray	41N/15	VanSickle, L.A.	Au	Assess.	1 DDH (182')	1980	-	SSM 1129
Meath	42C/8	Cut Thumb Mines (Cullen, R.M.)	Au,Ag	Assess.	SA,Tr,STr	1981	-	-
Meath	42C/8	Noranda Exploration Co. Ltd.	-	Assess.	GEM & Mag	1981	-	SSM 1525
Montgomery	41J/6	Garrelts, James E.	-	Assess.	GL	1979	2.3291	SSM 1709
Nouvel	41J/6	Garrelts, James E.	-	Assess.	GL	1979	2.3291	SSM 1709
Olsen	41N/1	Teck Explorations Limited	-	Assess.	EM & Mag	1980	-	-
Palmer	41N/2	Paquette, J.F.	Au,Ag,Co, Mo,Cu	Assess.	GL,SA	1980	2.3785 2.3392	SSM 2123
Rabazo	41N/15	Canabec Exploration Ltd.	Au	Assess.	2 DDH (387.2')	1980	-	SSM 2021
Rennie	42B/5	Noranda Exploration Co. Ltd.	-	Assess.	4 DDH (385')	1980	-	SSM 2094
Riggs	42C/8	Vega Gold Explorations Ltd.	Au	Assess.	35 DDH (6866.8')	1981	2.3436 2.3411 to 2.3415 inc.	SSM 2122
Stover	42B/5	Noranda Exploration Co. Ltd.	Au	Assess.	GEM & Mag	1981	2.3728	SSM 1487
Vankoughnet	41K/9	Prace Mining Ltd.	Pb,Ag	Assess.	9 DDH (3579') GEM & Mag	1981	2.3403	SSM 2128
West	42C/8	Cut Thumb Mines (Cullen, R.M.)	Au,Ag	Assess.	SA,TR	1981	-	-
M-8 Abbie Lake Area	42C/3	Noranda Exploration Co. Ltd.	-	Assess.	EM, Mag	1979	-	-
M-8 Abbie Lake Keating Add'l	42C/3	Noranda Exploration Co. Ltd.	Cu,Pb,Zn	Assess.	GL	1977	2.3477	SSM 1935
M-20 Pilot Harbour	41N/13	Asarco Exploration Co. of Canada Ltd.	-	D	AEM & Mag,GL	1973	-	SSM 2126
M-29 Mussy Lake	42D/9	Erana Mines Ltd.	-	Assess.	ARAD	1980	2.3439	SSM 2130

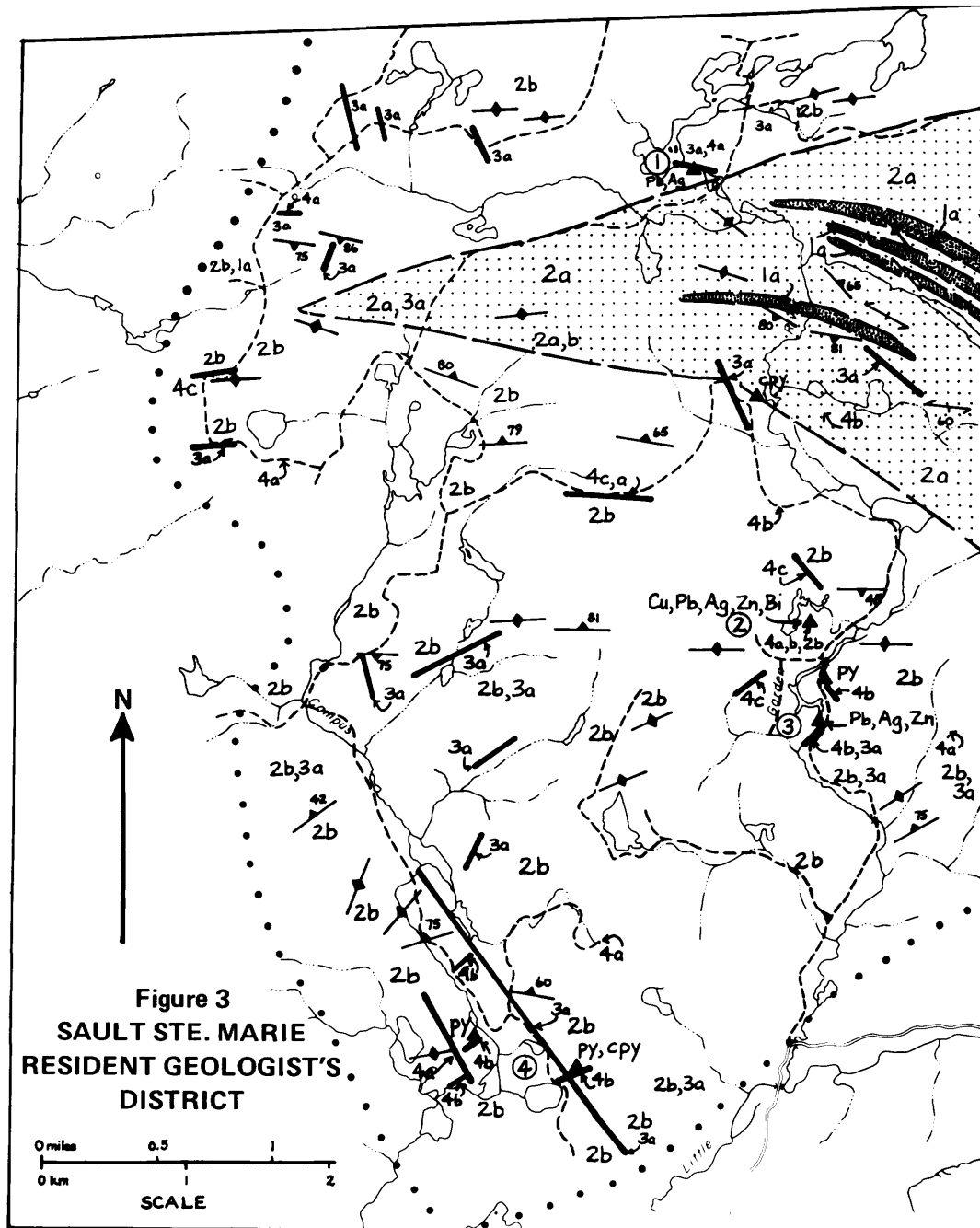


Figure 3
SAULT STE. MARIE
RESIDENT GEOLOGIST'S
DISTRICT

0 miles 0.5 1 2
0 km
SCALE

- Late Precambrian (Keweenaw)**
 4a Lamprophyre
 4b Felsite
 4c Diabase, gabbro
- Middle to Late Precambrian**
 3a Diabase, gabbro
- Early Precambrian**
 2a Quartz Monzonite
 2b Gneissic tonalite, migmatite
 2c Amphibolite

LEGEND

- Symbols**
- ▲ Mineral Occurrence
 - ↗ Schistosity
 - ↖ Gneissosity
 - Dike (as coded)
 - - - Haulage Road

science Laboratories, Ontario Geological Survey gave values of 540 and 294 ppm (parts per million) copper, 530 and 320 ppm lead and 124 and 5250 ppm zinc. A very small selected sample from the adjacent rock dump returned 4.48 percent lead and 1.56 ounces silver per ton.

The sulfide minerals are almost entirely confined to the felsite dikes; pyrite occurs within amygdules with chlorite, as thin films along fractures, and as disseminated grains.

Conclusions

There seems to be a close spatial association between the base metal-silver occurrences in Hughes Township and dike rocks of Keweenawan age, especially felsite and lamprophyre. This association may be simply structural in that the deposits and the dikes share fracture systems active during Keweenawan time; or the relationship may be more genetic, in that the Keweenawan magmas supplied some material component (or heat) necessary for the formation of the deposits. The presence of pyrite and anomalous amounts of metals disseminated in some felsite dikes suggests this genetic association.

It can be seen from Figure 3 that five of the occurrences in Hughes Township occupy a linear trend with a direction of N10°W. In addition, Hurst (1928) showed an additional small galena vein about 700 m south-southeast of the Conway deposit (1). Neither prospectors nor the author have been able to locate this occurrence; but its indicated position on Hurst's map is directly on the N10°W trend.

Since the veins of at least some of the deposits (for example the Conway) strike at azimuths varying from the north-northwest direction, it is suggested that this group of deposits may be located at the intersection of two or more fracture systems.

Suggestions to Prospectors

Recent mapping by the author in Hughes Township has indicated that the argentiferous base-metal sulfide deposits in that area are spatially related to Keweenawan felsite dikes, lamprophyres, and diabase. Because diabase dikes are very common in the area, they do not provide good prospecting guides; but the distinctive bright pink to red coloured felsite and the dark inclusion-bearing lamprophyres are relatively uncommon. The presence of these latter rocks should be considered a plus factor in considering an area for prospecting.

The base metal-silver deposits in the Sault Ste. Marie-Goulais River area may occur along a linear trend; however, the trend may not parallel the strike of the individual veins.

The recent exploration by Corona Resources Limited in the Hemlo area has shown that significant gold

deposits are not restricted to quartz veins or areas of iron carbonate alteration. Any area of pyritic quartz sericite schist (metasandstone or felsic metatuff) should be examined and sampled for gold. Small amounts of bright green mica (fuchsite) and molybdenite occur in the Corona deposit and may be indicator minerals. Sampling of pyritic schist for gold should be systematic and not limited to a few grab samples, since some very rusty, sulfide-rich outcrops on Highway 17 near the Corona deposit contain no gold.

Ontario Geological Survey Activities

R.P. Sage carried out geological mapping in Musquash and Corbiere Townships in the Wawa area at a scale of 1 inch to ¼ mile or 1:15 840 (A, Figure 1).

E.C. Grunsky began field work on a 1:50 000 synoptic map and a report on the Batchawana area (B, Figure 1).

In 1981, a group of specialists consisting of Ian Thomson, formerly of the Ontario Geological Survey, J.A.C. Fortesque, environmental consultant, M.J. Dickman (limnologist), and J. Terasmae (paly-nologist) of Brock University studied the evolution of five selected lakes in the District of Algoma using geochemical, paly-nological, and biological techniques.

The preliminary results of the above studies are published in the Summary of Field Work, 1981, by the Ontario Geological Survey.

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1980: Origin of Uraniferous Conglomerates at Elliot Lake, Canada and Witwatersrand, South Africa: Implications for Oxygen in the Precambrian Atmosphere; Precambrian Research, Vol. 13, Number 1, p.1-26.

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Grunsky, E.C.

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Hofmann, H.J., Pearson, D.A.B., and Wilson, B.H.

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Leseleur, P.R.

1980: The Footwall Volcanic Rock of the Lucy Iron Formation, Michipicoten Area, Ontario; Unpublished Thesis, University of Western Ontario, London, 104p.

Sage, R.P.

1981a: Josephine Area, District of Algoma; p.37-40 *in* Summary of Field Work, 1981, by the Ontario Geological Survey, Edited by John Wood, O.L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 100, 255p.

1981b: Preliminary Interpretation of the Relationship Between Economic Mineralization and Volcanic Stratigraphy in the Wawa Area; p.41-44 *in* Summary of Field Work, 1981, by the Ontario Geological Sur-

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Sims, P.K., Card, K.D., Morey, G.B., and Peterman, Z.E.

1980: The Great Lakes Tectonic Zone—A major Crustal Structure in Central North America; Geological Society of America Bulletin, Vol. 91, pt. 1, p.690-698.

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1981: Geochemical Evolution of Lake Systems Northeast of Lake Superior: Integrated Studies in the Wawa Area, District of Algoma; p.168-171 *in* Summary of Field Work, 1981, by the Ontario Geological Survey, Edited by John Wood, O.L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 100, 255p.

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Ontario Geological Survey—Geological Survey of Canada

1979: Regional Lake Sediment and Water Geochemical Reconnaissance Data, Eastern Shore of Lake Superior, Ontario NTS 42 C, 42 F(S-2); Ontario Geological Survey, Open File Report 5267, 85p., 16 maps, Scale 1:250 000.

1981 Report of the Sudbury Resident Geologist

P. E. Giblin¹ and J. M. Martins²

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Introduction

The Sudbury office is staffed by: R. Adlington, Resource Geologist; P. E. Giblin, Resident Geologist; J. M. Martins, Resource Geologist; Y. M. Paquette, Secretary; and J. C. Wilson, Regional Mineral Resources Coordinator.

Exploration activity showed a marked increase during the year, and was principally directed towards the search for and evaluation of gold deposits.

Mining activity was highlighted by the opening of two new mines. Falconbridge Nickel Mines Limited began production of copper-nickel-precious metals ore from the Fraser Mine near Levack, and Manitoulin Dolomite Limited began production of dolomite for aggregate from a quarry on Manitoulin Island. Because of declining markets for nickel, Inco Metals Company announced in December that the Coleman Mine will be closed by March 1982.

¹Resident Geologist, Ontario Ministry of Natural Resources, Sudbury.

²Resource Geologist, Ontario Ministry of Natural Resources, Sudbury.

Resident Geologist's Activities

R. Adlington compiled 58 Data Series Maps of which 30 have been published. Publication of the remainder is expected soon, and further maps are in preparation.

J. M. Martins commenced detailed mapping of small granitic intrusions in the Sudbury Complex in Blezard Township.

P. E. Giblin began a study of gold deposits in breccia zones in Huronian sedimentary rocks located in Scadding and Mackelcan Townships; visited quarries, mines, and exploration projects, and examined numerous mineral occurrences.

In other activities, the staff responded to many requests for information from industry, government agencies, and the public; participated in land-use planning projects; and led field trips for high school, university, and industry groups.

Early in the year, the Cobalt Resident Geologist's Office was re-opened with Leo Owsiaci in charge as Resident Geologist. Jurisdiction of a portion of the Sudbury Resident Geologist's District, including the Temagami and Cobalt areas, was transferred to Cobalt. Figures 1 and 2 reflect the revised District boundaries.

Mining Activity

Mining activity in the area is dominated by production of nickel, copper, and precious metals from the Sudbury-area mines of Falconbridge Nickel Mines Limited and Inco Metals Company. Other commodities produced during 1980 include uranium, silica, dolomite, sand, and gravel.

Nickel-Copper-Precious Metals

Falconbridge Nickel Mines Limited produced ore from the East, Falconbridge, Fecunis, Fraser, Lockerby, Onaping, and Strathcona Mines. The Fraser Mine was officially opened in September. Brought into production at a cost of \$200 million, the mine is expected to reach a production rate of 2 300 tonnes per day by 1983, and will employ about 500 persons.

Inco Metals Company produced ore from the Coleman, Copper Cliff South, Creighton, Frood, Garson,

NORTHEASTERN — SUDBURY

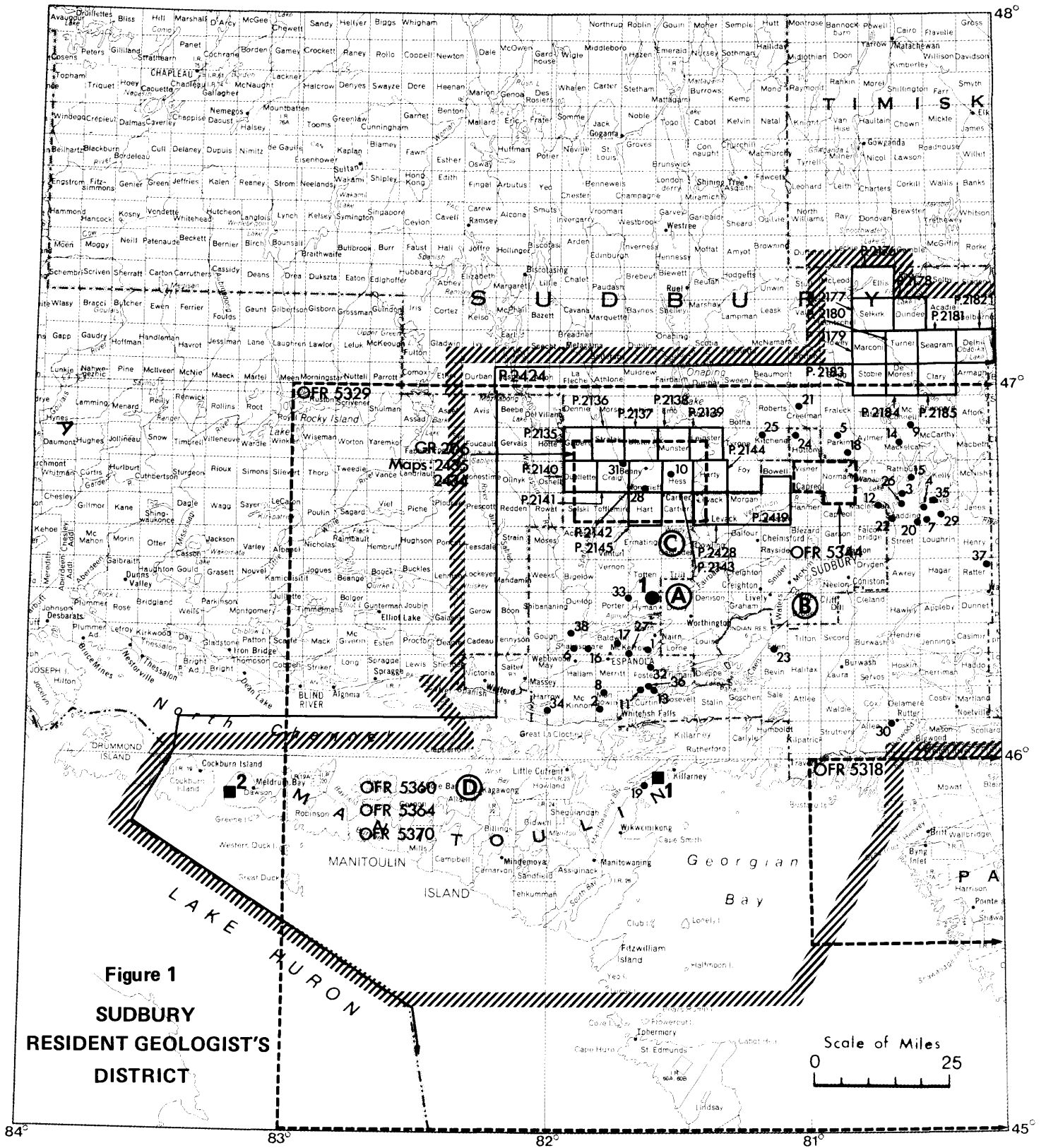


Figure 1
SUDBURY
RESIDENT GEOLOGIST'S
DISTRICT

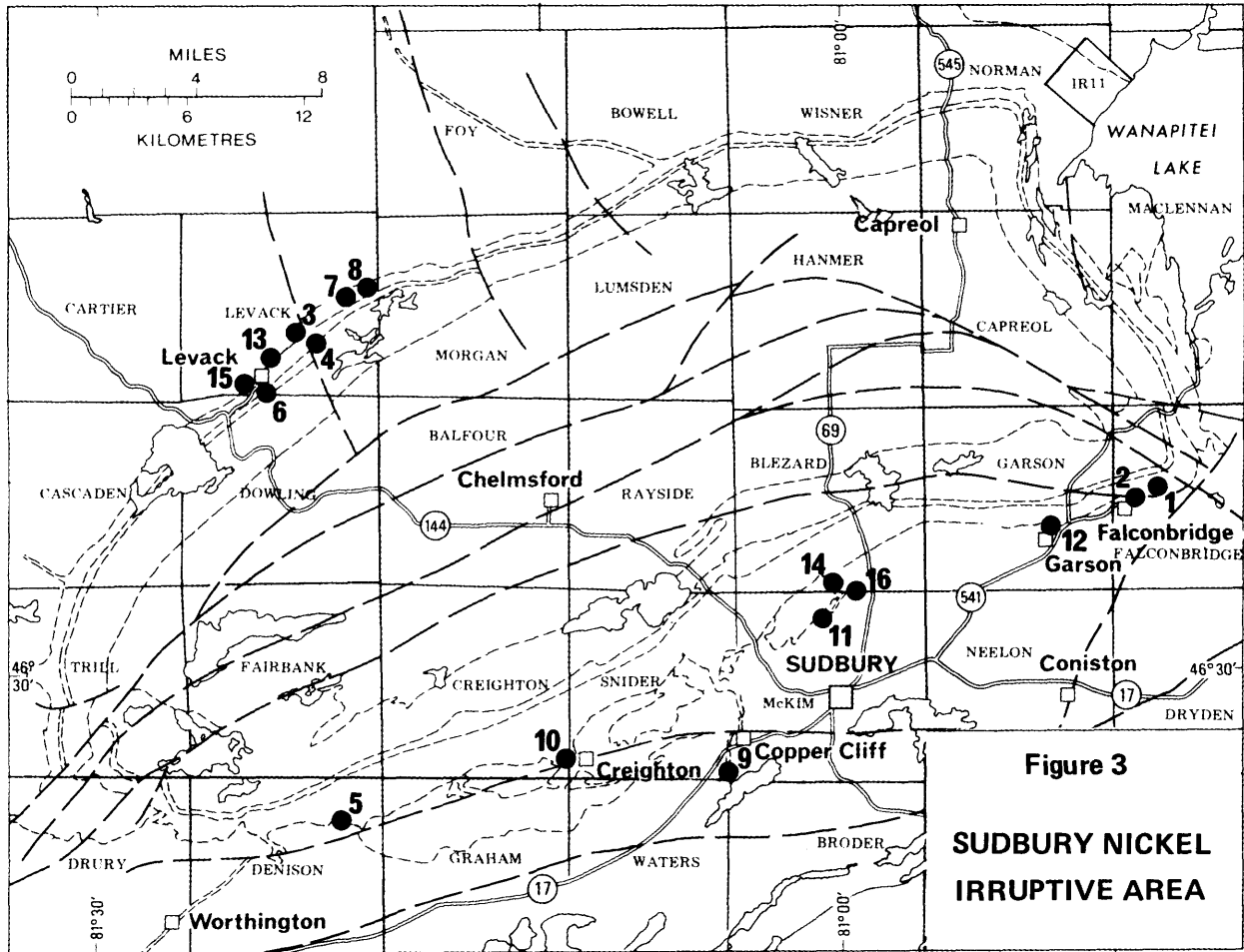


Figure 3
SUDBURY NICKEL
IRRUPTIVE AREA

EXPLANATION

- Producing Mines
- Falconbridge Nickel Mines Ltd. Ni, Cu, Pt, Co, Au, Ag
- 1. East Mine
- 2. Falconbridge Mine
- 3. Fecunis Mine
- 4. Fraser Mine
- 5. Lockerby Mines
- 6. Onaping Mines
- 7. Strathcona Mine

- INCO Metals Company. Ni, Cu, Pt, Se, Te, Co, Au, Ag, Fe
- 8. Coleman Mine
- 9. Copper Cliff South Mine
- 10. Creighton Mine
- 11. Frood Mine
- 12. Garson Mine
- 13. Levack Mine
- 14. Little Stobie Mine
- 15. McCreedy West Mine
- 16. Stobie Mine

Levack, Little Stobie, McCreedy West, and Stobie Mines. Because of a declining market for nickel, the company announced in December that the Coleman Mine will be closed by March 1982.

Uranium

Agnew Lake Mines Limited continued production on a salvage leach basis during the year.

Industrial Minerals

Indusmin Limited continued production of silica from the company's quarry on Badgeley Island in Georgian Bay.

A new quarry came into production during the year, when Manitoulin Dolomite Limited began production of dolostone from a quarry located at the west end of Manitoulin Island. Crushed dolomite is transported by ship to southwestern Ontario for use as aggregate. About 20 persons are employed.

Sand and gravel were produced from numerous pits, particularly concentrated in the Sudbury and North Bay areas.

Ontario Geological Survey Activities

B. O. Dressler of the Precambrian Geology Section continued a detailed study of the footwall and sub-layer of the Sudbury Nickel Irruptive, concentrating field work on the southwestern part of the Irruptive (A, Figure 1).

E. B. Freeman of the Geoservices Section conducted a mineral exploration course in Sudbury that was attended by 104 registrants (B, Figure 1).

J. Lafleur of the Precambrian Geology Section carried out mapping in Cascaden, Dowling, and Trill Townships (C, Figure 1).

M. D. Johnson of the Engineering and Terrain Geology Section continued field work designed to permit assessment of the limestone and dolostone resources of Manitoulin Island (D, Figure 1).

TABLE 1 | MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

<u>Ontario Geological Survey Reports</u>	<u>Coloured Maps</u>
GR 206	2434
<u>Open File Reports</u>	2435
OFR 5318 OFR 5360	<u>Northern Ontario Engineering Geology Terrain Studies Report</u>
OFR 5319 OFR 5364	NOEGTS 1
OFR 5329 OFR 5370	NOEGTS 102
OFR 5333	
OFR 5334	
<u>Preliminary Maps - Geological Series</u>	<u>Northern Ontario Engineering Terrain Studies Maps</u>
P. 2419	5042
P. 2424	
P. 2428	
<u>Preliminary Maps - Data Series</u>	<u>Mineral Resources Branch Publications</u>
P. 2135 P. 2140 P. 2145 P. 2180 P. 2185 P. 2444	MPBP 12
P. 2136 P. 2141 P. 2176 P. 2181 P. 2190 P. 2445	Gold
P. 2137 P. 2142 P. 2177 P. 2182 P. 2191 P. 2446	<u>Miscellaneous Reports</u>
P. 2138 P. 2143 P. 2178 P. 2183 P. 2197 P. 2447	MP 85 MP 95
P. 2139 P. 2144 P. 2179 P. 2184 P. 2443 P. 2448	MP 86
<u>Aggregate Resources Publications</u>	<u>Geological Survey of Canada Open File Reports</u>
<u>Federal - Provincial Maps</u>	<u>Preliminary Maps - Geophysical Series</u>
	P. 2481
	P. 2482

NORTHEASTERN — SUDBURY

TABLE 2

EXPLORATION ACTIVITY DURING THE YEAR.

The following is a list of companies and individuals known to have conducted exploration within the Sudbury Resident Geologist's district in 1981, exclusive of exploration work on the Sudbury Complex. The numbers correspond to the numbered areas on Figures 1 and 2.

Number on Figure	Individual or Company	Activity
1	Alanen, W.	Drilling, Nairn Township
2	Allard, J.	Trenching, Mongowin Township
3	Anglesea Development Ltd.	Drilling, gold prospect, Scadding Township
4	Barry, H. V.	Trenching, Davis Township
5	Blue, J.	Trenching, Parkin Township
6	Blue, P. G.	Trenching, Shakespeare Township
7	Brady, J.	Trenching, Davis Township
8	Canadian Nickel Company Ltd.	Geological and geophysical surveys, Mongowin Township
9	Canadian Nickel Company Ltd.	Prospecting, northeast of Lake Wanapitei
10	Cominco Ltd.	Magnetometer, EM surveys, drilling, base-metal prospect, Hess Township
11	Curtin Mines Ltd.	Drilling, copper-nickel prospect, Curtin Township
12	Delabbio, F.	Trenching, gold prospect, MacLennan Township
13	Dungarvon Mines Ltd.	Drilling, gold prospect, Curtin Township
14	Flag Oils Ltd.	Drilling, magnetometer, EM, IP surveys, gold prospect, Mackelcan Township
15	Floron Mining Enterprises Ltd.	Trenching, drilling, copper-nickel-platinum prospect, Rathbun Township
16	Galbraith, J.	Drilling, gold prospect, Shakespeare Township
17	Genest, S. A.	Drilling, Baldwin Township
18	Ike Burns Exploration Corp.	Trenching, Parkin Township
19	Indusmin Ltd.	Mapping, sampling, Badgeley Island
20	Laaksonen, A.	Geophysical, geological surveys, trenching, drilling, gold prospect, Scadding and Davis Townships
21	Larson, R.	Trenching, Creelman Township
22	Lee, J. B.	Trenching, Scadding Township
23	Luke Lake Ltd.	Magnetometer, EM surveys, gold prospect, Eden Township
24	McLean, P.	Drilling, Hutton Township
25	Moses, J.	Trenching, Kitchener Township
26	Northgate Explorations Ltd. (Scadding Gold Mines Ltd.)	Geological, geochemical surveys, trenching, drilling, gold prospect, Scadding Township
27	Owen, J. P.	EM survey, drilling, copper-nickel prospect, Baldwin and Nairn Townships
28	Rio Tinto Exploration Ltd.	Magnetometer, EM surveys, Moncrieff, Craig, Ulster, Stralak, Hess, Munster Townships
29	Silverside Resources Inc.	Magnetometer, EM surveys, Davis Township
30	Steep Rock Iron Mines Ltd.	Drilling, nepheline syenite prospect, Bigwood Township
31	Stralak Resources Inc.	Drilling, base-metal prospect, Craig and Ulster Townships
32	Sulpetro Minerals Ltd.	Drilling, tungsten prospect, Foster Township
33	Tamminen, T.	Sampling, gold-silver prospect, Porter and Hyman Townships
34	Teledyne Canada Ltd.	Drilling, cobalt-copper prospect, Harrow Township
35	Ultimate Energy Resources Ltd.	Trenching, gold prospect, Davis Township
36	Vaughn, W. S.	Magnetometer, EM surveys, Curtin Township
37	Warren Industrial Feldspar Ltd.	Drilling, feldspar prospect, Ratter Township
38	Woehr, J.	Trenching, Shakespeare Township

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SUDBURY REGION

Ag - silver
 Au - gold
 Co - cobalt
 Cu - copper
 Mo - molybdenum
 Ni - nickel
 Pb - lead
 Pt - platinum
 U - uranium
 W - tungsten
 GP - Geophysical Survey

DDH 10 - 12,640 - diamond drill hole
 10 holes 12,640 foot total
 Assess - Assessment Data
 GL - Geological Survey
 EM - Electromagnetic Survey
 IP - Induced Polarization Survey
 Mag - Magnetometer Survey
 Rad - Radiometric Survey
 Tr - Trenching
 SA - Sampling, Assays
 Geochem - Geochemical Survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Baldwin	41 I/5	Genest, S. A.	Au,Cu	Assess	GP,EM	1980		-
	41 I/5	Genest, S. A.	Au,Cu	Assess	DD 2-932	1981		-
Baldwin, Nairn	41 I/5	Owen, J. P.	Cu,Ni	Assess	Tr	1980		-
Bigwood	41 I/2	Steep Rock Iron Mines Limited	nepheline syenite	Assess	DD 7-1603	1981		-
Craig & Ulster	41 I/13	Stralak Resources Incorporated	Cu,Pb,Zn, Ag	Assess	GP,EM	1980		-
	41 I/13	Stralak Resources Incorporated	Cu,Pb,Zn, Ag	Assess	DD 7-1570,EM	1981		-
Creelman	41 I/14	Larson, R.		Assess	Tr	1980		-
	41 I/14	Larson, R.		Assess	Tr	1981		-
Curtin	41 I/4	Curtin Mines Limited	Au,Cu	Assess	DD 1-254	1980		-
	41 I/4	Curtin Mines Limited	Au,Cu	Assess	DD 6-1221	1981		-
	41 I/4	Elliot, A. T.	Au	Assess	Tr	1980		-
	41 I/4	Vaughn, W. S.	Au	Assess	GP,EM,Mag	1981		-
Davis	41 I/10	Barry, H. V.	Au	Assess	Tr	1981		-
	41 I/10	Brady, J.	Au,Ag	Assess	Tr,SA	1981		-
	41 I/10	Groundstar Resources Limited	Au,Cu	Assess	GP,EM,Mag,Rad, GL	1980	2.3505	-
	41 I/10	Silverside Resources Incorporated	Au,Cu	Assess	GP,EM,MAG	1981		-
	41 I/10	Smith, L.		Assess	Tr	1981		-
Eden	41 I/6	Luke Lake Limited	Au	Assess	GP,EM,Mag	1981		-
Foster	41 I/4	St. Joseph Explorations Limited	W,Cu,Mo	Assess	DD 5-2284,SA	1980		-
	41 I/4	Union Carbide Canada Limited	W,Cu,Mo	Assess	GP,Mag,EM	1979		-
Harrow	41 J/1	McCann, D. S.	Co	Assess	SA,Tr	1980	2.3624	-
	41 J/1	McCann, D. S.	Co	Assess	DD 1-48	1980		-
	41 J/1	Teledyne Canada Limited	Co,Cu	Assess	DD 6-642	1981		-
Hart	41 J/1	BP Minerals	U	Assess	GL	1979	2.3183	-
Hess	41 I/12	Cominco Limited	Cu,Pb,Zn	Assess	DD 1-327	1981		-
Hutton	41 I/14	Kerr Addison Mines Limited	Au	Assess	GP,Mag	1979, 1980	2.3813	-
	41 I/14	Kerr Addison Mines Limited	Au	Assess	GP,EM,Mag	1980	2.3529	-
Hutton & Parkin	41 I/14	Kerr Addison Mines Limited	Au	Assess	GP,Mag	1980	2.3558	-
Hutton, Parkin & Norman	41 I/14	Kerr Addison Mines Limited	Au	Assess	Tr	1980		-
Hyman	41 I/5	Tamminen, T.		Assess	SA	1981		-

P. E. GIBLIN AND J. M. MARTINS

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Kitchener	41 I/14	Moses, J. R.	Pb, Zn	Assess	Tr	1981		-
Mackelcan	41 I/15	Flag Oils Limited	Au	Assess	DD 3-921, GP, Mag, EM, IP	1981		-
McKinnon	41 I/4	L.O.C.C.	Au	Assess	GP, EM, Mag	1980	2.3312	-
Moncrieff, Craig, Ulster, Stralak, Hess & Munster	41 I/4	Rio Tinto Exploration Limited	Zn, Pb, Cu, Ag	Assess	GP, EM, Mag	1980		-
	41 I/4	Rio Tinto Exploration Limited	Zn, Pb, Cu, Ag	Assess	GP, EM, Mag	1981	2.3735	-
Mongowin	41 I/4	Allard, J.	Au	Assess	Tr	1981		-
Morgan	41 I/11	Falconbridge Nickel Mines Limited	Cu, Ni	Assess	GP, EM, Mag	1980	2.3448	-
Nairn	41 I/5	Alanen, W.	Cu, Ni	Assess	Tr	1980		-
	41 I/5	Alanen, W.	Cu, Ni	Assess	DD 5-224	1981		-
	41 I/5	Owen, J. P.	Cu, Ni	Assess	Tr	1980		-
	41 I/5	Owen, J. P.	Cu, Ni	Assess	DD 3-144	1981		-
Norman	41 I/5	Kerr Addison Mines Limited	Au	Assess	GP, Mag	1980	2.3557	-
Parkin	41 I/15	Blue, J.		Assess	Tr	1981		-
	41 I/15	Ike Burns Exploration Corporation	Ni, Cu	Assess	Tr	1981		-
Parkin & Hutton	41 I/15	Kerr Addison Mines Limited	Au	Assess	GP, Mag	1980	2.3493	-
Porter	41 I/5	Tamminen, T.	Ag, Au	Assess	SA	1981		-
Rathbun	41 I/15	Floron Mining Enterprises Limited	Ni, Cu, Pt	Assess	Tr	1981		-
	41 I/15	Viitala, R. L.		Assess	GP, EM	1980	2.3623	-
Scadding	41 I/10	Anglesea Development Limited	Au	Assess	GP, EM, Mag, Tr	1980		-
	41 I/10	Anglesea Development Limited	Au	Assess	GP, EM, Mag	1980	2.3453	-
	41 I/10	Lee, J. B.		Assess	Tr	1981		-
	41 I/10	Scadding Gold Mines Limited	Au	Assess	DD 34-10, 023, GP, EM, Mag, A	1980		-
Scadding & Davis	41 I/10	Laaksonen, A.	Au, U	Assess	GL, GP, Rad, Tr SA, DD 3-4949.5	1981		-
Shakespeare	41 I/15	Blue, P. G.	Au	Assess	Tr, DD 1-25	1980		-
	41 I/15	Blue, P. G.	Au	Assess	SA	1980	2.3615	-
	41 I/15	Blue, P. G.	U	Assess	SA	1980	2.3718	-
	41 I/15	Blue, P. G.	Au	Assess	SA, Tr	1981	2.3996	-
	41 I/15	Galbraith, J.	Au, Cu	Assess	SA	1979	2.3353	-
	41 I/15	Galbraith, J.	Cu, Au	Assess	Tr	1980		-
	41 I/15	Galbraith, J.	Au, Cu	Assess	DD 1-101.5	1981		-
	41 I/15	Woehr, J.	U	Assess	Tr	1981		-

Exploration Activities

There was a sharp increase in exploration activity during the year with the number of projects carried out more than doubling the level attained in 1980. The number of new claims recorded also showed a marked increase: to mid-December 1981, a total of 3 042 new claims had been recorded in the Sudbury Mining Division, compared with a total of 1 948 new claims recorded the previous year.

Most activity centered on the search for, and evaluation of, gold deposits associated with sedimentary rocks of the Huronian Supergroup and with the Nipissing Diabase. In the Lake Wanapitei area, Northgate Explorations Limited and Flag Oils Limited carried out extensive drilling programs on gold deposits located in Scadding and Mackelcan Townships, respectively. Several other companies and individuals carried out work on gold prospects in the Lake Wanapitei area, principally in Scadding, Davis, and MacLennan Townships.

Gold occurrences in the Espanola area also received attention, and several companies carried out regional geological studies with the objective of evaluating Huronian sedimentary rocks as possible hosts for Witwatersrand-type gold deposits.

Exploration for copper-nickel-precious metal deposits associated with the Sudbury Complex continued in the Sudbury area by Falconbridge Nickel Mines Limited and Inco Metals Company. Copper-nickel deposits associated with Nipissing Diabase were investigated in the Espanola area by J. P. Owen and Curtin Mines Limited, and in the Lake Wanapitei area by Floron Mining Enterprises Limited. A copper-lead-zinc-silver deposit in the Archean Benny greenstone belt was drilled by Stralak Resources Incorporated.

A tungsten occurrence in Huronian rocks near Espanola was drilled, in a joint-venture project, by Sulpetro Minerals Limited and Union Carbide Canada Limited. In the same general area, Teledyne Canada Limited drilled a cobalt-copper occurrence.

Several industrial mineral deposits in the Grenville Province were explored. A nepheline syenite deposit in Bigwood Township was drilled by Steep Rock Iron Mines

Limited, a feldspar deposit in Ratter Township was drilled by Warren Industrial Feldspar Limited, and Indusmin Limited carried out mapping and sampling in the vicinity of the company's silica deposit on Badgeley Island in Lake Huron.

Some Recent Publications

Abel, M. K.
1981: The Structure of the Strathcona Copper Zone; Canadian Institute of Mining and Metallurgy Bulletin, February, p.89-97.

Doucet, Pierre
1981: A Petrographical Study of Mafic Inclusions in the Levack Complex; Unpublished B.Sc. Thesis, Queen's University, Kingston, 38p.

Johnson, M. E.
1981: Correlation of Lower Silurian Strata from the Michigan Upper Peninsula to Manitoulin Island; Canadian Journal of Earth Sciences, Vol. 19, p.868-883.

Latour, T. E.
1981: Metamorphism and Geothermometry near Coniston, Ontario: A Clue to The Tectonic Evolution of the Grenville Front; Canadian Journal of Earth Sciences, Vol. 18, p.884-898.

Morris, W. A.
1981a: Intrusive and Tectonic History of the Sudbury Micropegmatite: The Evidence from Paleomagnetism; Economic Geology, Vol. 76 (4), p.791-804.

1981b: Fault Block Rotations in the Southern Province as Defined by Paleomagnetism of the Nipissing Diabase; Canadian Journal of Earth Sciences, Vol. 18, Number 11, p.1755-1757.

Rousell, D. H.
1981: Fabric and Origin of Gneissic Layers in Anorthositic Rocks of the St. Charles Sill, Ontario; Canadian Journal of Earth Sciences, Vol. 18, Number 11, p.1681-1693.

Sims, P. K., Card, K. D., Morey, G. B., and Peterman, Z. E.
1980: The Great Lakes Tectonic Zone—A Major Crustal Structure in Central North America; Geological Society of America Bulletin, Vol. 91, p.690-698.

1981 Report of the Algonquin Region

David J. Villard¹ and Hans D. Meyn²

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Introduction

The Algonquin Region, for Mineral Management purposes, is divided into two areas of responsibility (see Figure 1).

The Huntsville office is staffed by William J. Logan, Mineral Resources Coordinator, David J. Villard, Geologist, and Martha Fabricius, Secretary. The Geologist

¹Geologist, Ontario Ministry of Natural Resources, Huntsville.

²Resident Geologist, Ontario Ministry of Natural Resources, Bancroft.

position was created in December 1980 and generally has the same function as that of a Resident Geologist. During the past year, Wendy Martin was employed on contract to conduct an industrial mineral inventory of the Algonquin Region.

The Bancroft office is staffed by Hans D. Meyn, Resident Geologist, and Karen Maxwell, Secretary.

Resident Geologist's Activities

Huntsville

The Huntsville office is responsible for an area that is little understood geologically, and has been virtually ignored in the past. The mineral potential is uncertain, resulting in minimal exploration in the past 30 years. For this reason, examination of all existing mineral occurrences, as well as familiarization with the geology, has been initiated in the hopes of stimulating exploration.

Consultative duties, mainly for local prospectors, consumed some time as the geologist's presence became known. Other activities included conducting and attending geological field trips and discussion groups, liaising with Ministry of Natural Resources district staff, and allotting a significant amount of time to the land use planning process.

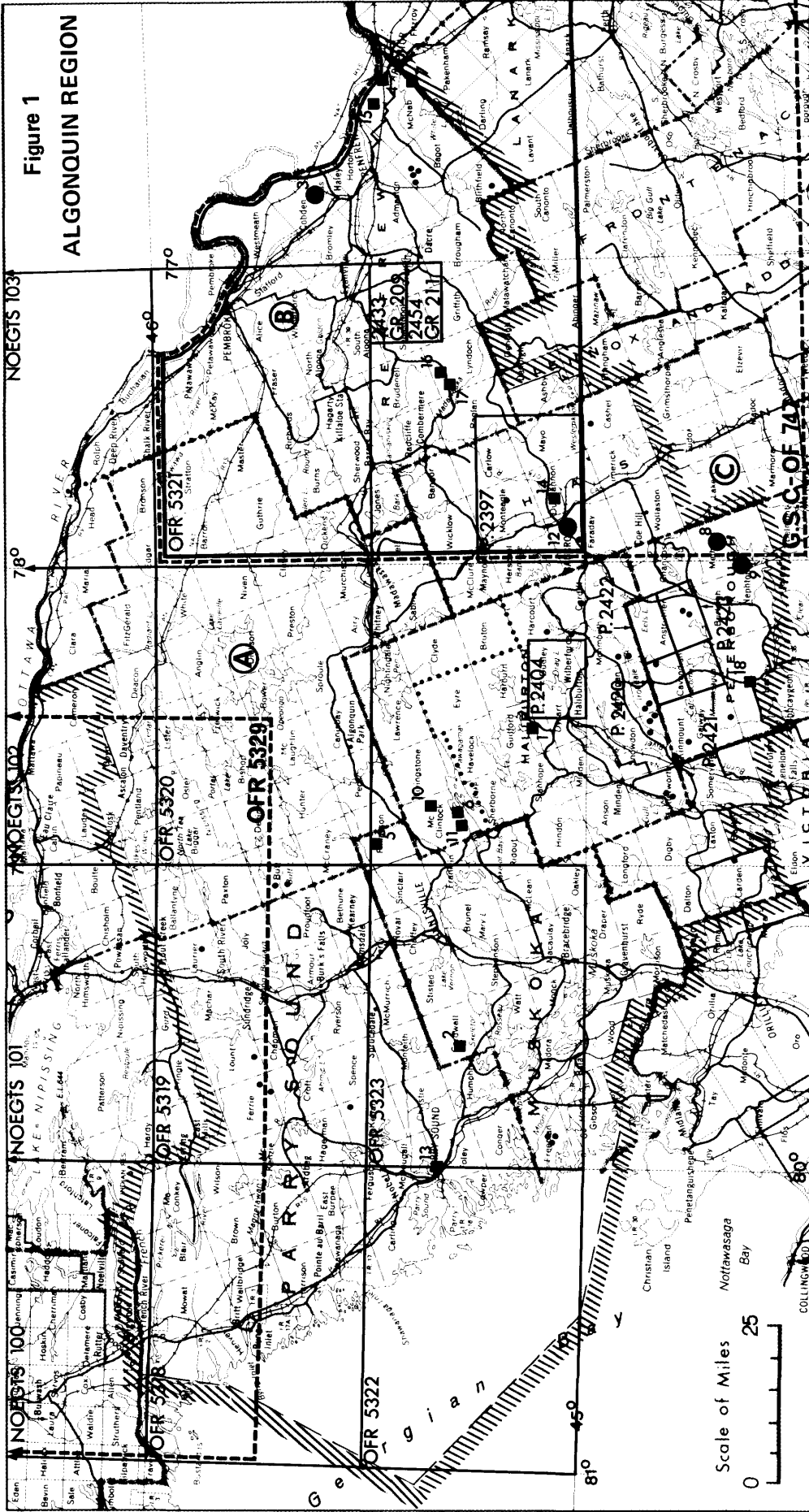
In February, a workshop with the general theme 'What can be done to encourage exploration in the Grenville' was held at the Leslie M. Frost Natural Resources Centre.

In September, 1981, a project was initiated to evaluate the potential of 'reported' gold occurrences in the Central Gneiss Belt. A thorough literature review, as well as conversations with local prospectors identified about 60 possible occurrences. Of these, 32 were located in the field, mapped, and sampled. It is hoped that results will be published as an Open File Report as soon as possible after completion of analytical work.

The industrial mineral inventory of the Algonquin Region began in June 1981 and is scheduled for completion in June 1983. It comprises three stages:

1. *Literature Search*: Compilation of existing data from Ontario Geological Survey and Geological Survey of Canada publications; assessment work reports; quarry permits; Ontario Ministry of Transportation and Communications quarry data; and private communications.

Figure 1
ALGONQUIN REGION



Producing Mines and Quarries, Algonquin Region

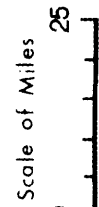
- Producing mines, 1981
- Producing quarries, 1981
- 1. Boleider's crushed stone
- 2. Cardwell Tp. building stone
- 3. Chromasco Ltd. Mg, Ca, Sr
- 4. Dochart Clay Products clay, sand
- 5. Finlayson Tp. building stone
- 6. O. Geldschus. building stone
- 7. Hoffman Concrete Products Ltd. crushed stone
- 8. IMC Chemical Group (Canada) Ltd. neph., syenite
- 9. Indusmin Ltd. neph., syenite
- 10. International Quartz Ltd. quartz
- 11. L. Lock. building stone
- 12. Madawaska Mines Ltd. building stone
- 13. Mill Lake Quarry building stone
- 14. Princess Sodallite Mine sodalite
- 15. Smith Construction Ltd. crushed stone
- 16. Wal-Gem Lapidary beryl, min
- 17. Wal-Gem Lapidary rose quartz
- 18. A. D. Webster crushed stone

EXPLANATION

- A R. Kodybka — Achray Area — NTS 31F/13
- B D. Russell — Paleozoic Outliers
- C B. Goldstein — Bannockburn — NTS 31C/12
- Assessment Work Filled in 1981
- Boundary of Bancroft Resident Geologist's District

Location of Field Parties

- A R. Kodybka — Achray Area — NTS 31F/13
- B D. Russell — Paleozoic Outliers
- C B. Goldstein — Bannockburn — NTS 31C/12
- Assessment Work Filled in 1981
- Boundary of Bancroft Resident Geologist's District



2. *Field Work:* Field assessment of those mineral occurrences deemed worth investigating either because literature search suggests these have economic potential, or the commodity is unusual, in high demand, and warrants a field description.

3. *Inventory Publication:* Final report covering examined and unexamined mineral sites, will be divided on a commodity basis, and will include economic and marketing data for the commodity.

Stage 1 is now complete. Throughout the 1981 and 1982 winter, occurrence localities will be plotted on 1:50 000 and 1:250 000 scale maps. Targets for field assessment will be chosen at this time, based upon literature descriptions and accessibility.

Bancroft

The Resident Geologist in Bancroft has now completed his first year on the job. Aside from regular duties, he spent the time available familiarizing himself with the local geology and locating and briefly examining about

25 non-active properties, as well as visiting all operating mines. Other activities included consulting with prospectors and mineral collectors, attending geological field trips, lecturing at a Junior Ranger Camp, and devoting considerable time to land use planning.

About 35 000 feet of diamond drill core, donated by Kerr Addison Mines Limited, were moved from the company property (the Cam-Kerr property) in Cardiff Township to the yard of the District office where the core is set-up in racks and available for examination and study. One rack has fallen over, contains 15 000 feet of core, and remains on the property. An effort will be made in 1982 to retrieve this core.

For the first time in several years the Ontario Ministry of Natural Resources, Algonquin Region, sponsored a booth at the Bancroft Gemboree, and at the Wilberforce Rockfair, featuring Dr. D.H. Gorman, Professor of Mineralogy, University of Toronto, who identified minerals for the public. The Resident Geologist co-hosted the booth and displayed and sold pertinent government publications.

TABLE 1 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

Abbreviations used:

D.D.H. (2-715')	- Diamond Drill Hole (2 holes, 715 feet total)	Geophys.	- Geophysical Survey
EM	- Electromagnetic Survey	Rad.	- Radiometric Survey
VLF	- Very Low Frequency EM	Mag.	- Magnetic Survey
Geochem.	- Geochemical Survey	MEAP	- Mineral Exploration Assistance Program
Geol.	- Geological Survey		

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Haliburton Co. Cardiff Twp.	31E/1	Opawica Explorations Ltd.	Uranium	Drill Log	D.D.H. (8-1593')	1981	-	Cardiff 205
Haliburton Co. Glamorgan Twp.	31D/16	St. Joseph Explorations Ltd.	Base Metals	Geol. Geochem.	Mapping Soil Sampling	1980	2.3550	Glamorgan 23
	31D/16	Canadian Smelting & Refining (1974) Ltd.	Base Metals	Geol. Geochem.	Mapping Sampling	1978	2.3712	Glamorgan 24
Haliburton Co. Harcourt Twp.	31E/1	Golden Goose Gold Mine Co. Ltd.	Uranium	Geophys.	Mag., Rad.	1979	2.3166	Harcourt 11
Haliburton Co. Lutterworth Twp.	31D/15	St. Joseph Explorations Ltd.	Base Metals	Geophys.	Mag., VLF-EM	1981	2.3809	Lutterworth 6
Haliburton Co. Monmouth Twp.	31D/1	Lacana Mining Corp.	Uranium	Geophys.	Rad.	1979	2.2997	Monmouth 108
	31D/16	St. Joseph Explorations Ltd.	Base Metals	Geol. Geochem.		1979/ 1980	2.3758	Monmouth 109
	31D/16	Silver Acorn Developments Ltd.	Uranium	Drill Log	D.D.H. (10-1756')	1979/ 1980	MEAP E083A 63.3786	Monmouth 110
Haliburton Co. Snowdon Twp.	31D/15	Canadian Smelting & Refining (1974) Ltd.	Base Metals	Geol. Geochem.	Mapping Sampling	1979	2.3711	Snowdon 18
	31D/16	Canadian Smelting & Refining (1974) Ltd.	Base Metals	Drill Log	D.D.H. (1-672.2m.)	1980	-	Snowdon 19
	31D/15	Canadian Smelting & Refining (1974) Ltd.	Base Metals	Drill Log	D.D.H. (1-291m.)	1978	-	Snowdon 20
Hastings Co. Cashel Twp.	31C/13	C. Roger Young	Talc	Drill Log	D.D.H. (1-145')	1981	-	Cashel 1

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hastings Co. Faraday Twp.	31F/4	Robert L.V. Ekstrom	Uranium	Drill Log	D.D.H. (1-156.9')	1981	-	Faraday 75
Hastings Co. Monteagle Twp.	31F/4	Canadian Crystal Spa Corp.	Uranium	Sketch	Bulldozing	1980/1981	-	Monteagle 15
Muskoka Dist. Freeman Twp.	31E/4	Cable Copper Mines	Uranium	Geol.	Mag., Rad., Mapping	1978	-	Freeman 24
	31E/4	Cable Copper Mines	Uranium	Geol.	Mag., Rad., Mapping	1978	-	Freeman 25
Nipissing Dist. Butt Twp.	31E/11	Harold Barry	?	Geol.	Geol.	1979/1980	2.3511	Butt 19
	31E/11	Jamés Lupo	Uranium	Drill Log	D.D.H. (1-104')	1980	-	Butt 20
Parry Sound Dist. Ferrie Twp.	31E/12	Everett T. Jones	Copper	Sketch	Manual	1980	-	Ferrie 13
	31E/12	Everett T. Jones	Copper	Sketch	Manual	1980	-	Ferrie 14
Parry Sound Dist. Laurier Twp.	31E/14	Edwin J. Rantala	?	Sketch	Manual	1981	-	Laurier 9
Parry Sound Dist. Lount Twp.	31E/12	Pominex Limited	Calcium Carbonate	Drill Log	D.D.H. (9-1380.9', 421 m.)	1980	-	Lount 10
Parry Sound Dist. McKellar Twp.	31E/12	Pominex Limited	Calcium Carbonate	Drill Log	D.D.H. (7-759', 231.7 m.)	1980	-	McKellar 4
Peterborough Co. Anstruther Twp.	31D/16	Temagami Oil & Gas Ltd.	Uranium	Geol. Geophys.	Sampling Mag., Rad.	1979	2.3346	Cavendish 83
	31D/16	Northgate Exploration Ltd.	Uranium Molybdenum	Drill Log	D.D.H. (8-1660') Assaying	1981	-	Anstruther 86
	31D/16	Northgate Exploration Ltd.	Uranium	Geophys.	Rad., Mapping, Assaying	1980	2.3890	Anstruther 87
Peterborough Co. Cavendish Twp.	31D/16	Temagami Oil & Gas Ltd.	Uranium	Geol. Geophys.	Sampling, Mag., Rad.	1979	2.3346	Cavendish 83
Peterborough Co. Galway Twp.	31D/15	Thomas D. Pearson	?	Sketch	Manual	1980	-	Galway 28
	31D/10	William R. Barnes Company Limited	?	Drill Log	D.D.H. (1-260')	1981	-	Galway 29
Renfrew Co. Bagot Twp.	31F/7	William Henry Douglas	?	Drill Log	D.D.H. (2-483')	1980	-	Bagot 5
	31F/7	St. Joseph Explorations Ltd.	Base Metals	Geophys.	VLF-EM, Mag.	1980	2.3664	Bagot 6
	31F/7	Douglas Brown	?	Sketch	Trenching	1980	-	Bagot 7
	31F/7	St. Joseph Explorations Ltd.	Base Metals	Geophys.	EM, Mag.	1980	2.3663	Bagot 8
Renfrew Co. Blithfield Twp.	31F/2	Norman Pilatzke	?	Mechanical	Trenching	1980	-	Blithfield 13

Other Geological Activities

Ontario Geological Survey

Maps and reports issued by the Ontario Geological Survey in 1981 are shown on Figure 1, and listed in Table 2.

Precambrian Section

Preliminary maps of Anstruther and Cavendish Townships were published at a scale of 1:15 840 (Bright 1981a and b). Bright will probably commence a synoptic survey of the Kinmount area in 1982.

The results of fieldwork in the Drag Lake area were published at a scale of 1:15 840 (Culshaw 1981).

Engineering and Terrain Geology Section

R.J. Kodybka and assistants carried out detailed mapping on a scale of 1:50 000 in the northeastern part of Algonquin Park. Six NTS sheets will be mapped over a three year period: 31 E/8, 31 E/9, 31 E/10, 31 E/16, 31 F/13, and 31 G/15. Map sheet 31 F/13 was completed in 1981. This project is being done in association

with the Parks and Recreation Section, Algonquin Region. It is hoped that significant earth science features will be outlined that might be used in the parks interpretive and protection program, and that the mapping will help ensure 'proper' utilization of the aggregate resources.

D. J. Russell (1981) mapped the Paleozoic outliers resulting from down-faulting connected with the Ottawa-Bonnechere-Lake Timiskaming structures.

B.S. Goldstein mapped the Quaternary Geology of the Bannockburn area (NTS 31 C/12).

Leslie M. Frost Natural Resources Centre

The Leslie M. Frost Natural Resources Centre continued its program of demonstrating resource management to students who are mainly from public and secondary schools. The lapidary room had over 1 000 visitors during the past summer. Diamond drilling continued on the demonstration claim bringing the total footage drilled to 500. The logged and assayed cores add to the geological, geophysical, and geochemical information already available for use with the client groups. It is felt that this claim could be better utilized, especially by the mineral industry and universities. It is ideal for the demonstration of Crown Land acquisition, filing of assessment requirements, and prospecting and exploration techniques. Additional information is available from either D. Villard (Huntsville) or from G. Hamilton, Director of the Leslie M. Frost Natural Resources Centre.

Geological Survey of Canada

Dr. A. Davidson of the Superior-Grenville Section, Geological Survey of Canada, continued mapping the Grenville Province between 45°N and 45°N from Byng Inlet west and north of Huntsville. More information will be available in the Geological Survey of Canada Report of Activities to be released in early January.

W.M. Schwerdtner and Christopher Mawer of the University of Toronto, in association with A. Davidson, mapped in the Bracebridge-Gravenhurst area.

W.W. Shilts of the Geological Survey of Canada, continued a program of drift sampling on, and west of, the Frontenac Arch, investigating the regional distribution of buffering components and trace metals in glacial drift.

Royal Ontario Museum

S.B. Lumbers continued studies of the boundary between the Algonquin Batholith and the Grenville Supergroup and mapped in the Bancroft-Haliburton area during 1981.

Universities

W.M. Schwerdtner, University of Toronto, received a Geoscience Research Grant from the Ontario Geological

TABLE 2

MAPS AND REPORTS PERTAINING TO THE ALGONQUIN REGION ISSUED BY THE ONTARIO GEOLOGICAL SURVEY IN 1981. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

Ontario Geological Survey Reports

Report 209

Report 211

Open File Reports

OFR 5318

OFR 5319

OFR 5320

OFR 5321

OFR 5322

OFR 5323

OFR 5329

OFR 5366

OFR 5368

Miscellaneous Papers

MP 95

MP 98

MP 100

Preliminary Maps

P 2397

P 2404

P 2420

P 2421

P 2422

P 2423

Coloured Maps

Map 2433

Map 2454

Mineral Deposits Circulars

MDC 20

MDC 21

MDC 22

MDC 23

Northern Ontario Engineering Geology Terrain Study Reports

100

101

102

103

Northern Ontario Engineering Geology Terrain Study Maps

5003

5040

5041

5042

5043

Survey to study the 'Structural Controls of the Uranium Deposits in the Bancroft-Gooderham Area'. Richard Bedell, graduate student, examined the structural geology of the Madawaska Mines as part of this study.

K. Bell, Carleton University, received an Ontario Geoscience Research Grant to study the use of 'Latter-Stage Decay Products of ^{222}Rn in Waste Management'.

S.J. Haynes, Brock University, received an Ontario Geoscience Research Grant to study the 'Characterization of Assimilation-type Uraniferous Pegmatites, Bancroft Region'.

Exploration Activity

As of November 30, 1981 a total of 215 claims were staked in the Algonquin Region in 1981. The following is a seven year summary of staking activity:

Year	New Recordings
1975	1425
1976	786
1977	647
1978	646
1979	299
1980	194
1981	215

Source: Mining Recorders Office, Ministry of Natural Resources, Toronto.

Staking activity was related to interest in base metals, uranium, and industrial minerals, particularly quartz and graphite.

Of some interest to explorationists may be the fact that the Ministry of Natural Resources acquired lands are now available for exploration upon application to the local Ministry District offices of the Algonquin Region.

The location of properties on which assessment work was filed in 1981 are shown in Figure 1 and are listed in Table 1.

Base Metals

Exploration for base metals was carried out in the area northeast of the town of Parry Sound. Several prospectors have come up with encouraging results on their own properties. In some cases, geophysical and geochemical surveys might prove beneficial if conducted over the occurrences. The mapping of A. Davidson of the Geological Survey of Canada should provide useful geological information that will help in the mineral evaluation of properties in the area.

Much exploration for zinc continued in the marbles of the Grenville Supergroup.

Gold

Exploration for gold has been very active in the 'gold belt' south of the Algonquin Region. Some exploration for

gold was conducted in the Huntsville area and in Bagot Township, but work is still in the preliminary stage.

Quartz

Exploration for quartz for possible utilization in the electronic industry centred around a well-known occurrence in Murchison Township, near the town of Madawaska on Highway 60. The 'vein-like' quartz is associated with a pegmatite dike. Similar occurrences of quartz, associated with pegmatites, have been examined across the area. Many of the veins appear to be characterized by a 'pinching and swelling' with maximum thicknesses of up to 5 m. Generally, the lengths of the veins are indeterminate, although in one case the vein can be traced for several km.

Silica for glass sand is being prospected in the southern townships of the Region where large, uniform deposits, closer to market are of interest.

Graphite

With the recent doubling of the price of graphite, interest in graphite has been seen in all of eastern Ontario.

Exploration for graphite has been concentrated in the area north of Huntsville, within the pelitic gneisses of the Central Gneiss Belt. A diamond-drill program was completed on one of the more promising properties. The graphite occurs as flakes disseminated throughout rusty-weathering pelitic gneisses and schists. In some cases, the graphite can be traced for considerable distances (A. Davidson, Geological Survey of Canada, personal communication), enhancing the potential for deposits of substantial tonnage. Grades of selected grab samples were usually estimated by the author to run from 1 to 10 percent graphite with an average grade of 4 to 6 percent graphite. Fine and coarse flakes of graphite were observed by the authors.

An area surrounding a known graphite deposit in northwestern Cardiff Township was also diamond drilled in 1981. (Assessment Work Files, Bancroft Resident Geologist, Ontario Ministry of Natural Resources).

Mining Activity

The nepheline syenite deposit in Methuen Township is mined by Indusmin Limited near Nephton and by IMC Chemical Group (Canada) Limited near Blue Mountain. In 1981, Indusmin operated throughout the year at rated capacity (450 000 TPY) and IMC completed the expansion of its operations from 240 000 TPY to 300 000 TPY. Both companies produce a wide range of glass, ceramic, and extender pigment grade products.

Uranium concentrate production continued at Madawaska Mines Limited, southwest of Bancroft. Earlier in the year, the company negotiated an agreement for deliveries with customers to the end of 1982.

The production of magnesium and calcium metals continued uninterrupted from the open pit and reduction plant of Chromasco Limited near Haley Station.

In addition, dolomite is produced by Bolender's Limited in Guilford Township. Veneer stone, flagstone, and aggregate are produced from quarries in the region, and flower pots are manufactured by Dochart Clay Products of Arnprior.

Recommendations

Base Metals

The base-metal potential of the Parry Sound area should be investigated. The area to the northeast of the City of Parry Sound warrants further exploration due to the possible association of gold with base-metal occurrences.

Base-metal occurrences associated with volcanic rocks in the Grenville Supergroup, as well as zinc associated with marbles, deserve further study, especially at present when new geological work is slowly unravelling the stratigraphy of the area.

Gold

The potential for gold has always been considered minimal in the generally high grade metamorphic rocks of the Algonquin Region. It is hoped that the results of the current gold study conducted by geological staff of the Huntsville office will encourage exploration.

Industrial Minerals

In December, 1981, the Honourable A.W. Pope, Minister of Natural Resources announced that \$7.7 million of BILD (Board of Industrial Leadership and Development) funds will be used to provide grants of up to 25 percent of the approved capital costs for mine development which will involve (initially) the following commodities: phosphates, silica, talc, potassic feldspar, magnesite, mica, whiting, barite, some building and ornamental stones, and kaolin.

There are many known occurrences of pegmatite quartz suitable for high purity silica production, as well as lower grade, but larger, deposits of sandstone (quartzite) in the Algonquin Region.

Potassic feldspar, mica, phosphate (apatite), and building and ornamental stones were formerly produced in the Algonquin Region.

The recent doubling in the price of graphite may warrant reexamination of the numerous known graphite deposits. Although these were diamond drilled in the past, additional exploratory drilling is required to properly assess the deposits.

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1981 Report of the Eastern Region Resident Geologist

P.W. Kingston¹, V.C. Papertzian², A.E.F. Hinton³, and M.A. Klugman⁴

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⁴Regional Mines Coordinator, Kemptville.

Introduction

The office of the Regional Mines Coordinator is located in Kemptville. T.W. Fletcher is the Mineral Resources Manager. A.E. McKay, Resource Geologist, resigned during the year and was succeeded by A.E.F. Hinton in June. Five contract staff performed most of the field work this season.

The Resident Geologist, P.W. Kingston, is located in Tweed and has three contract staff working for him. Fourteen part-time staff which included eight Experience '81 students were hired this summer to work on various geological projects.

V.C. Papertzian was responsible for writing the major part of this activity report.

Mining Activity

Producing mines in Eastern Ontario are shown in Figure 1. The three cement producers were in production throughout 1981, with the Pointe Anne limestone quarry closing in November of 1981. Grenville Aggregate Specialties Limited and Stoklosar Marble Quarries (1969) Limited, continued production of marble specialty products and terrazzo chips. The William R. Barnes Company Limited sold its calcium carbonate quarry at Tatlock and its Perth plant to Steep Rock Iron Mines Limited. The company purchased the Canada Talc Industries Limited talc mine in Madoc. Ram Petroleum Limited completed construction of a mill for processing tremolite from its Palmerston Township open pit mine. The tremolite products will be used as additives for asphalt road construction.

Peat production by Diamond Peat Moss Limited in Stormont Township continued in 1981.

Exploration Activity

In 1981, approximately 190 new claims were recorded in Eastern Ontario, barely half the number recorded in 1980. The decreased staking was probably due to lower metal prices as well as the unavailability of unstaked gold properties.

Figure 1 shows the area of claim staking activity during the year, as well as the location of properties on which assessment work has been filed.

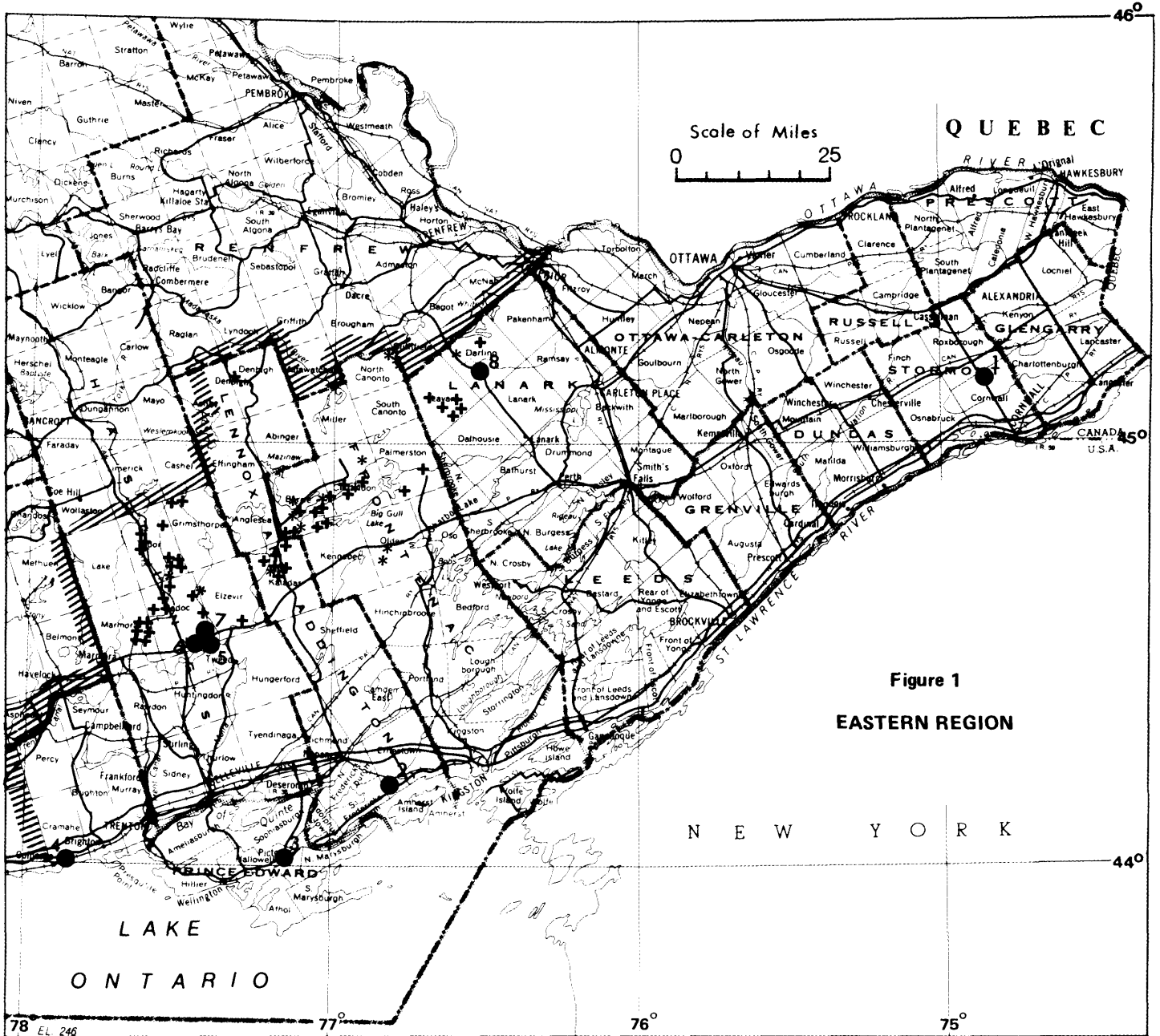


Figure 1
EASTERN REGION

EXPLANATION

- | | |
|--|--|
| <ul style="list-style-type: none"> ● Producing mines (excepting clay and aggregate extractive operations). 1. Diamond Peat Moss. peat 2. Canada Cement Lafarge Ltd. limestone (cement) 3. Lake Ontario Cement Co. Ltd. limestone (cement) 4. St. Lawrence Cement Co. Ltd. limestone (cement) 5. Canada Talc Industries Ltd. talc 6. Grenville Aggregate Specialties Ltd. marble 7. Stocklosar Marble Quarries (1969) Ltd. marble 8. Steep Rock Ltd. calcium carbonate | <ul style="list-style-type: none"> + Claim staking activity in 1981 * Assessment work filed in 1981 //// Boundary of Resident Geologist's district. |
|--|--|

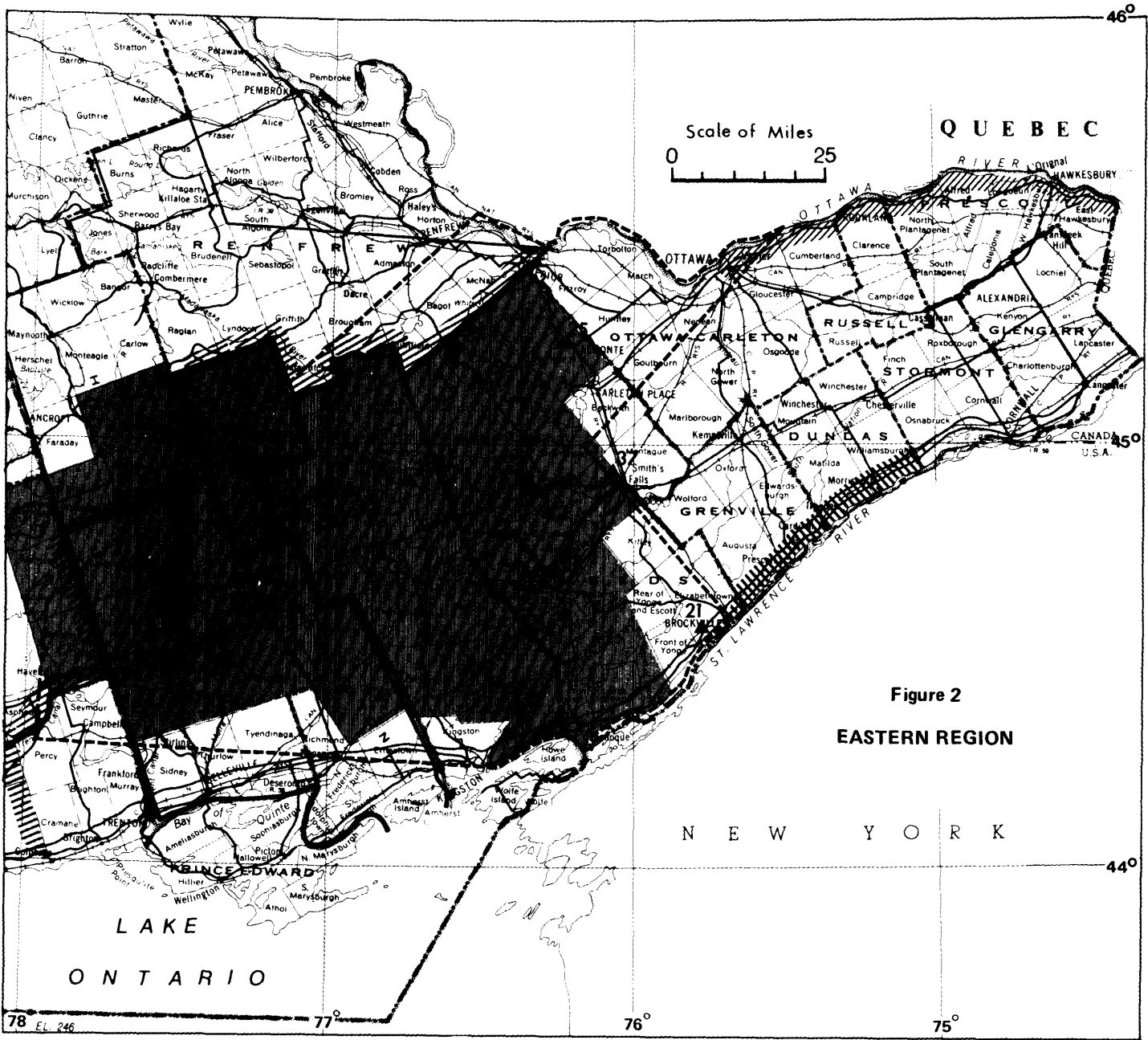


Figure 2
EASTERN REGION

EXPLANATION

- | | |
|---|--|
|  Boundary of Eastern Region |  Preliminary pit Inventory |
|  Madoc Map Area |  Aggregate Assessment |
|  Study area of Barite Fluorite Veins |  St. Lawrence River Corridor Mapping |
|  Marble Survey 1980 and 1981 |  Slope Stability Study |
|  Exploration Activity in 1981
(Keyed to Table #1.) | |

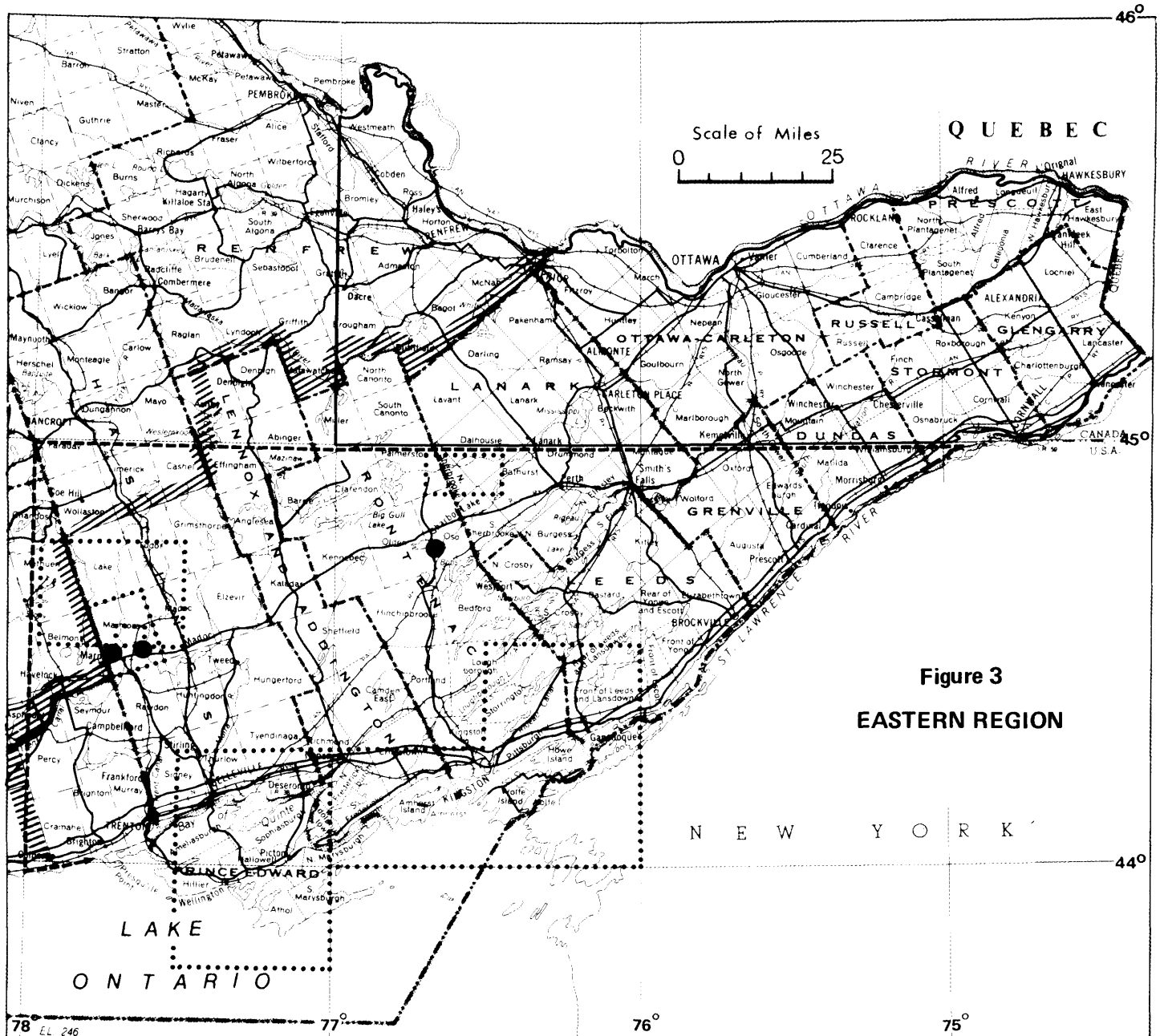


Figure 3
EASTERN REGION

EXPLANATION

- OGS Field Mapping Parties
- Specific Study Area
- Project Boundary

- Terrain Evaluation Studies
- By Gartner Lee Associates Ltd.
- By Geo-Analysis Ltd.

////// Boundary of Eastern Region

Since much of the exploration work undertaken in Eastern Ontario is on private land, there is no obligation on the part of the company to report its activities. Many of the companies, however, have been cooperative in keeping the Ontario Ministry of Natural Resources informed of their activities, and in many cases voluntarily supplied information on a confidential basis. It is therefore not possible to report all of the exploration activity in the Eastern Region.

Gold

Considerable exploration for gold took place during the year, and most of the old gold properties and past producers saw some activity, ranging from diamond drilling to trenching (see Figure 2).

D.A. Hardie carried out trenching and assaying on a property at the east end of Mississagon Lake in Barrie Township.

Canreos Minerals (1980) Limited own a block of claims surrounding the Star of the East Gold Mine about 5 km northeast of Cloyne in Barrie Township. Geology, trenching, and a magnetometer survey were carried out this year on these claims.

E. Sager carried out limited diamond drilling near the former Sophia Diamond Mine in Madoc Township.

E & B Explorations Incorporated of Vancouver carried out a 3 000 m (10 000-foot) diamond drilling program at the Addington Mine (Golden Fleece Deposit) in June 1981. This program tested extensions of the mineralized zone outlined by Cominco Limited between 1935 and 1939 and gave encouraging results. Cominco Limited developed the zone underground on the 90 m (300-foot) level along a strike length of 970 m (3 200 feet) and to a proved depth of 236.2 m (775 feet) over a shorter strike length. Approximately 227 000 t (250 000 tons) of marginal grade ore was developed by 1938. The property was allowed to flood in 1939 and no significant exploration work had been carried out in the interval until 1980.

The Cordova Gold Mine in Belmont Township is undergoing continued exploration. Since the property lies just outside the Eastern Region boundary, the description of exploration activities is found in the report of the Central Region Geologist, this volume.

Mono Gold Mines Limited performed rock trenching on the Bannockburn Gold Mine property in Madoc Township. The company is currently conducting a diamond drilling and sampling program.

The Craig Gold Mine in Tudor Township is being reassessed. Approximately 4 km of access road has been upgraded and a comprehensive program of dump sampling has taken place.

Lyndex Explorations Limited recently acquired the former Ore Chimney Gold Mine in Barrie Township. The company acquired both surface and mining rights to the property; ownership of mineral and surface rights by different parties had been inhibiting exploration progress for many years. The company plans a comprehensive exploration program.

Base Metals

A number of properties in Barrie, Olden, Tudor, Clarendon, Madoc, and North Canonto Townships were explored during the year for base metals. Selco Mining Corporation Limited and Sulpetro Minerals Limited (formerly St. Joseph Explorations Limited) continued exploration for zinc (see Figure 2).

Mica

A muscovite mica property in Kaladar Township has undergone further work since the previous year. Road access totalling 2.4 km in length was built, and it is reported (J. Byer, personal communication) that a 125-ton bulk sample followed by a 4 500 t (5 000-ton) bulk sample will be taken in the spring of 1982. This fine-grained mica deposit appears to be suitable for the production of fillers for the plastics industry.

The property was visited by regional geological staff a number of times during the late summer and fall. A zone approximately 90 m long and 30 m wide has been stripped in preparation for the bulk sampling program. The mica zone has a strike length in excess of 1.6 km and a width of 60 m to 120 m (Resident Geologist's Files, Ontario Ministry of Natural Resources, Tweed). The rock is a muscovite-quartz phyllite which in the area of the test pit, contains approximately 50 percent muscovite.

A number of other companies are actively assessing muscovite exploration targets in the Kaladar-Hungerford area and in the Fernleigh-Ardoch area.

Silica

A considerable amount of exploration for silica has been carried out by a number of companies this past year, including geological mapping, diamond drilling, sampling and analyses, bench tests for both foundry grade and glass grade, and market studies. As all of the activity is on private land, details of each of the programs cannot be given without the express permission of the individual companies.

Industrial Minerals Program

This is a joint Government of Ontario and Government of Canada program, which is part of the Canada-Ontario, Eastern Ontario Subsidiary Agreement. The program seeks to identify, catalogue, and direct attention to the industrial mineral potential of southeastern Ontario. A combined program of geological, geophysical, and mineral potential studies, mineral economies, and commodity appraisals has been undertaken to encourage the private sector to explore for industrial minerals in high potential target areas. The programs carried out in 1981 are described as follows.

TABLE 1

EXPLORATION ACTIVITY DURING THE YEAR.

Number on Figure	Individual or Company	Activity
1	N. Axiotis	Geological mapping, North Canonto Township.
2	W. R. Barnes Company Ltd.	Geological mapping, diamond drilling, bench testing, Storrington Township.
3	S. Bartlett	Stripping and trenching, Barrie Township.
4	J. Byers	Staking and sampling, Elzevir Township.
5	Canada Talc Industries Ltd.	Geological mapping, diamond drilling, Madoc, Huntingdon Townships.
6	Canadex Ltd.	Reactivated mill, North Burgess Township.
7	Canreos Minerals (1980) Ltd.	Geophysics, geological mapping, Barrie Township.
8	H. F. Cook	Diamond drilling, assaying, Barrie Township.
9	Craig Gold Mines Ltd.	Access development, sampling, Tudor Township.
10	E. & B. Explorations Ltd.	Diamond drilling, Kaladar Township.
11	R. L. V. Ekstrom	Geophysics, geological mapping, Marmora Township.
12	Elgin Silica	Diamond drilling, bench testing, South Crosby Township.
13	Gilmour Gold Explorations Ltd.	Access development, assaying, Grimsthorpe Township.
14	C. F. Gleeson	Geochemistry, Darling Township.
15	D. A. Hardie	Trenching, assaying, Barrie Township.
16	I. J. Hartikainen	Geological mapping, trenching, Barrie Township.
17	Koizumi Group Canada Ltd.	Access development, bulk sample, Kaladar Township.
18	Lyndex Ltd.	O.M.E.P. agreement, Anglesea Township.
19	Mono Gold Mines Ltd.	Trenching, diamond drilling, assaying, dewatering, Madoc Township.
20	J. L. Montgomery	Geological mapping, Madoc Township.
21	Ministry of Natural Resources	Diamond drilling, Elizabethtown Township.
22	Ministry of Natural Resources	Diamond drilling, Pittsburgh Township.
23	Ministry of Natural Resources	Diamond drilling, Storrington Township.
24	Ministry of Natural Resources	Diamond drilling, North Crosby Township.
25	Ministry of Natural Resources	Diamond drilling, Ramsay Township.
26	Ottawa Silica	Reassessing property, Bathurst Township.
27	N. Pilatzke	Blasting and trenching, North Canonto Township.
28	Ram Petroleum Ltd.	Mill construction, access and pit development, Clarendon Township.
29	Earl C. Sager	Diamond drilling, Madoc Township.
30	Selco Mining Corporation Ltd.	Geochemistry, Clarendon Township.
31	Selco Mining Corporation Ltd.	Diamond drilling, Clarendon Township.
32	Steep Rock Limited	Broad expansion and exploration program, Darling Township.
33	St. Joseph Explorations Ltd.	Geophysics, Olden Township.
34	W. S. Vaughan	Geochemistry, geophysics, Darling Township.
35	R. C. Young	Staking, sampling, diamond drilling, Madoc, Elzevir Townships.
36	Roy Young	Diamond drilling, Kaladar Township.
37	-	Property under evaluation, North Elmsley Township.
38	-	Property under evaluation, South Burgess Township.

Calcium Carbonate

V.C. Papertzan, G. Keep, and P. Barber completed the initial phase of a marble survey in the Eastern Region. The purpose of the survey was three-fold: to identify areas of high calcium marble suitable as an industrial mineral source; to assess the variability of marbles; and to determine the Ca/Mg ratio for each marble belt as a guide to industrial mineral and base-metal mineralization. The boundary of the survey was extended to include townships in both Algonquin and Central Regions (see Figure 2). 1 042 samples were collected from lithologically homogeneous stratigraphic marble units. At the end of 1981, 1000 of the samples were each analyzed for 22 elements. The balance of the analyses should be received by early 1982. An Open File Report will be released in the spring of 1982.

This program is a continuation of the calcium carbonate feasibility studies originally funded under the Regional Priority Budget of the Ontario Ministry of Treasury and Economics in 1976. The earlier studies considered the economics and potential markets for a calcium carbonate industry in Eastern Ontario, and included the investigation of a number of properties.

Barite-Fluorite Veins

D.A. Williams and G.B. Keep carried out field examination and sampling of 70 post-Ordovician veins composed of calcite, fluorite, barite, celestite, galena, sphalerite, and chalcopryrite (see Figure 2). The field program is expected to result in the establishment of well-defined guidelines for exploration for additional deposits. Significant past production from vein deposits included the following: 1) approximately 136 000 t (150 000 tons) of ore grading 60 percent fluorite (Madoc area, 1905-1960); 2) approximately 907 000 t (100 000 tons) of high-purity calcite from a vein 20 m thick (Marlhill, 15 km north of Sharbot Lake, in production until about 1950), and 3) approximately 820 800 t (905 000 tons) of ore grading 5 percent lead (Kingdon Mine 10 km east of Arnprior, 1914-1931).

An Open File Report on this work will be published in 1982.

Silica

As part of the on-going Ontario Ministry of Natural Resources program on silica, a cooperative program with CANMET has been undertaken to test a number of differing grades of silica for suitability as a foundry sand. CANMET is carrying out the laboratory segment of the study, while the Ontario Ministry of Natural Resources is providing field data and samples. Five diamond-drill holes were drilled in 1981 to obtain 10 m samples through the section (see Figure 2). In addition, a 200 kg surface sample was taken from a site believed to be of foundry sand potential.

Aggregate Resources

On January 1, 1981, all previously undesignated townships in the Eastern Region became designated under

The Pits and Quarries Control Act. Three Mineral Resource Supervisors and two additional Pits and Quarries Inspectors were hired to administer this Act. Ministry staff held public meetings with township and county councils in the newly-designated areas to explain the purpose and administration of the Act.

The aggregate assessments of the Eastern Region continued this year, funded jointly by the Provincial and Federal governments, under the Eastern Ontario Subsidiary Agreement. The reports for the United Counties of Prescott and Russell, Leeds and Grenville, Stormont, Dundas, and Glengarry have been prepared and will be available in 1982. The reports for Lanark and Prince Edward Counties will be completed by spring, 1982.

Aggregate studies continued in Hastings, Renfrew, and Lennox and Addington Counties (see Figure 2). Northern Hastings and Renfrew County investigations were continued with the cooperation of the Algonquin Region. The southeastern portion of Renfrew County was tested using seismic geophysical equipment. A drilling program will be carried out in the spring to confirm this preliminary survey. The western half of the county was the subject of a preliminary pit investigation (see Figure 2) during the summer, and geophysical testing and drilling during the fall. Twenty-nine townships have been completed in Renfrew County.

A final geophysical and drilling study of northern Hastings County was carried out this summer. The remaining southern half of the county was covered by a preliminary pit survey and will be tested next summer.

A complete preliminary aggregate survey was conducted in Lennox and Addington County and a draft report was prepared. The samples collected during the drilling program and preliminary survey combined with the seismic tests aid in the delineation of economic aggregate deposits suitable for construction purposes.

During the aggregate assessment program, a total of 591.0 m of drilling were carried out in 472 holes; 622 seismic surveys were run, and 732 samples were taken for testing.

Ontario Geological Survey Activities

Field parties from the Precambrian, Mineral Deposits, and Engineering and Terrain Geology Sections of the Ontario Geological Survey were active in the Eastern Region during the 1981 season (see Figure 3).

(a) Detailed mapping in the Dalhousie Lake area at a scale of 1:15 840 was carried out by Leiba Pauk. This area is adjacent to the area previously mapped by Pauk and has potential for gold, base metals, and uranium mineralization.

(b) Detailed mapping of Marmorata Township at a scale of 1:15 840 was carried out by J.R. Bartlett and J.M. Moore. This was the second half of the Belmont-Marmorata mapping project. The area contains the former producing Cordova and Deloro Gold Mines, and

EASTERN

TABLE 2

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

<u>Metal Symbols</u>		<u>Explanation of Abbreviations Used</u>						
Au - Gold	AEM -	Airborne Electromagnetic Survey	GL -	Geological Survey				
Ag - Silver	Assess -	Assessment Work	Mag -	Magnetometer Survey				
Pb - Lead	DD -	Diamond-drilling	rTr -	Rock Trenching				
Zn - Zinc	Non Assess -	Non Assment Work Data	VLF -	Very low Frequency				
	Geochem -	Geochemical Survey						

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Barrie Township	31/C/14	S. Bartlett	-	Assess.	rTr	1981	-	#81-37
Barrie Township	31/C/14	Canreos Minerals (1980) Ltd.	Au	Assess.	rTr, GL	1980	2.3490	-
Barrie Township	31/C/14	Canreos Minerals (1980) Ltd.	Au	Assess.	Mag	1981	2.3738	#81-26
Barrie Township	31/C/14	H. F. Cook	Au,Ag,Pb	Assess.	Assay	1981	2.3804	-
Barrie Township	31/C/14	H. F. Cook	Cu,Zn	Assess.	DD1-50	1980	-	#81-23
Barrie Township	31/C/14	H. F. Cook	Cu,Zn	Assess.	DD1-96	1980	-	#81-24
Barrie Township	31/C/14	H. F. Cook	Cu,Zn	Assess.	DD1-148	1980	-	#81-25
Barrie Township	31/C/14	D. A. Hardie	Au,Ag	Assess.	Assay,rTr	1980	-	#EO-82
Barrie Township	31/C/14	D. A. Hardie	-	Assess.	rTr	1980	-	#80-63
Barrie Township	31/C/14	D. A. Hardie	-	Assess.	rTr	1980	-	#80-64
Barrie Township	31/C/14	D. A. Hardie	-	Assess.	DD5-129	1980	-	#80-65
Barrie Township	31/C/14	D. A. Hardie	-	Assess.	Assay	1980	-	#80-67
Barrie Township	31/C/14	I. J. Hartikainen	Au,Ag,Zn	Non-Assess.	Assay,GL	1980	-	#EO-81
Clarendon Township	31/C/15	Selco Mining Corporation Ltd.	Au,Zn	Assess.	Geochem	1980	2.3409	-
Clarendon Township	31/C/15	Selco Mining Corporation Ltd.	Zn	Assess.	DD1-120	1981	-	#81-28
Darling Township	31/F/2	C. F. Gleeson & Associates Ltd.	Au	Assess.	Geochem	1980	2.3269	-
Darling Township	31/F/2	W. S. Vaughan	-	Assess.	Geochem	1981	-	#81-31
Darling Township	31/F/2	W. S. Vaughan	-	Assess.	Mag	1981	-	#81-33
Elzevir & Madoc Townships	31/C/11	C. R. Young	-	Assess.	DD3-1000	1981	-	#81-45
Kaladar Township	31/C/11	Roy Young	-	Assess.	DD1-220	1981	-	#81-43
Madoc Township	31/C/12	Extender Minerals of Canada	Ag	Non-Assess.	DD1-114	1980	-	#EO-83
Madoc Township	31/C/12	Mono Gold Mines	Au	Assess.	rTr	1981	-	#81-48
Madoc Township	31/C/12	J. L. Montgomery	-	Assess.	GL	1980	-	#81-1
Madoc Township	31/C/11	E. Sager	-	Assess.	DD1-348	1981	-	-
Marmora Township	31/C/12	R. L. V. Ekstrom	-	Assess.	Mag	1981	-	#81-40
Marmora Township	31/C/12	R. L. V. Ekstrom	-	Assess.	GL	1981	-	#81-41
North Canonto Township	31/F/2	N. Axiotis	-	Assess.	AEM	1980	-	#80-24
North Canonto Township	31/F/2	N. Axiotis	-	Assess.	GL	1980	-	#80-66
North Canonto Township	31/F/2	N. Pilatzke	-	Assess.	rTr	1980	-	#80-62
Olden Township	31/C/15	St. Joseph Explorations Ltd.	-	Assess.	VLF	1981	-	#81-18
Olden Township	31/C/15	St. Joseph Explorations Ltd.	-	Assess.	Mag	1981	-	#81-19
Olden Township	31/C/15	St. Joseph Explorations Ltd.	-	Assess.	VLF	1981	-	#81-20
Olden Township	31/C/15	St. Joseph Explorations Ltd.	-	Assess.	Mag	1981	-	#81-21

TABLE 3

AGGREGATE PRODUCTION FROM LICENSED PITS AND QUARRIES DURING THE YEAR.

1980

District	Number of Designated Townships	Number of Licensed Pits and Quarries	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)	Total (Tonnes)
Carleton Place	11	147	1712 980	3621 985	-	5334 965
Napanee	12	152	1632 368	2541 009	-	4173 377

a number of significant base-metal prospects. The industrial mineral potential of the area is considered to be high.

(c) M. S. Bourque carried out a regional study of the stratigraphy and sedimentation of carbonate and associated clastic metasediments in the Grenville Province. Understanding of these parameters will be of value in the search for metallic and nonmetallic mineral deposits.

(d) B.S. Goldstein mapped the Quaternary geology of the Bannockburn area, (NTS 31 C/12) at 1:50 000 scale.

(e) D.M. Carson mapped the Quaternary geology of the Belleville-Kingston area (NTS 31 C/1,2,8) and the Ottawa-St. Lawrence Lowlands area (NTS 31 B/5,11,12,13,14; 31 G/3,4) at a scale of 1:50 000.

(f) Two terrain evaluation contracts were let to consultants to be carried out in the Eastern Region on NTS map sheets 31 C; 31 B/NW, 31 F/NE, SE, 31 G/SW, SE at a scale of 1:100 000. The work will be completed in early 1982.

(g) A.C. Colvine and T.R. Carter continued a comprehensive metallogenic study of the Grenville Province.

Geological Mapping

Resident Geologist's Program

Under the direction of P.W. Kingston, a field evaluation project of the Tudor metavolcanics and associated metasediments in the Madoc-Queensboro-Bannockburn area was commenced this year by C. Verchuren (see Figure 2); D.A. Williams has also been involved with certain structural and lithologic aspects of this project. The project will mainly evaluate the industrial mineral, and to a lesser extent, base-metal potential of this important suite of rocks. Included in this area are former producers of pyrite (sulphuric acid plant-Nichols Chemical Company), iron ore (magnetite), hematite (ochre), arsenic, gold, copper, and current producers of marble, talc, roofing granules, terrazzo chips.

This is the first year of a three year project, and a preliminary report and map is planned for late 1982.

St. Lawrence Parks Commission

Mapping in conjunction with the St. Lawrence Parks Commission of surficial and bedrock geology, along a corridor running from the Quebec border to Adolphus-

town and lying between the 401 Highway and the St. Lawrence River was completed this year (see Figure 2). A comprehensive report will be completed in the fiscal year, 1981, for use as an interpretive document by the Commission in their park development program.

Mineral Education Program

During the summer, regional staff visited the Murphy's Point Junior Ranger Camp. The students were given a talk on general geology of the area, and were given a tour of the Silver Queen Mine.

Geotechnical Engineering Program

An update of the slope stability study along the Ottawa River was conducted by J. Turner. The banks along the Ontario side of the river were analyzed from the City of Ottawa to the Carillon Dam on the Quebec border. The study should be ready for publication by mid 1982.

Two major landslides occurred in the region during 1981. The first occurred in the Village of Clarence Creek where a house was displaced 1 m off its foundation. The second occurrence was on the South Nation River several kilometres west of Wendover. Serious movement resulted in the evacuation of four houses on the site. Both failures are being continuously monitored.

Publication of the slope stability study of the South Nation River has been authorized by the South Nation Conservation Authority.

Provincial Parks

An interpretive study of the Silver Queen Mine in Murphy's Point Provincial Park was begun this year in conjunction with Regional District Parks. The site was partially cleared, an inventory of artifacts was made, and an historical summary started. This was done in conjunction with the Junior Ranger program and in cooperation with the regular park staff. In the next few years, after completion of historical research, site clearing, landscaping, and the reconstruction of the original mine buildings, this former phosphate-mica-feldspar mine will become an active interpretive site.

1981 Report of the Central Regional Geologist

Mahendra Narain¹

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¹Regional Geologist, Central Region.

Introduction

Consultative services and geoscience information continued to be provided from the Regional Geologist's Office at Richmond Hill and the five District Offices at Fonthill, Cambridge, Maple, Lindsay, and Midhurst. The client groups included private consultants, the mining and aggregate industry, prospectors, various government agencies, municipalities, and the general public.

Three gypsum mines and 884 licenced pits and quarries continued their operations at a slightly slower pace during the year due to a slump in the construction industry across the province.

The Regional geoscience library acquired some new material during the year, and continued to be used by various user groups and the general public.

As reported last year (Narain 1981), inter-program and inter-ministry consultations have been on the increase both at the Regional and at the District levels.

The Regional Geologist continued administering geological programs related to geoscience information, data collection, and mineral resource management. Also technical direction and support was provided to the Districts' geological-mineral resource programs.

The mineral resources staff at the Regional Office included: Dr. Lloyd Thompson, Mines Coordinator; Jackie Van Den Brand, Resource Geologist; and Pat Taylor, Secretary. The geological staff at the District Offices included Ted Harvey (Cambridge), John Fraser (Niagara), Bill Fitzgerald (Huron), Amar Mukherjee (Maple), and Dennis Billings (Lindsay).

Regional Geologist's Activities

Resources and Land Use Planning

The District Strategy exercise continued through the year. The final draft of the strategies is presently under review at the Regional Office. Input by the Ontario Ministry of Natural Resources to the Niagara Escarpment planning process also continued through the year. The public hearings on the Proposed Niagara Escarpment Plan continued, and the last stage of Phase II hearings are being held in the Regional Municipality of Niagara.

A large part of the Regional Geologist's time was spent in attending the sector hearings on the proposed Niagara Escarpment Plan, and coordinating several mineral resource studies initiated in the Region. The

CENTRAL

sandstone resource evaluation is being conducted by Ted Harvey in Cambridge District. A mineral inventory of the Central Region is being conducted by G.R. Guillet, a consulting industrial minerals geologist. Both of these studies are expected to be completed in early 1982. Also, considerable time was spent on a compilation map of the Ministry's input to the proposed Niagara Escarpment Plan, which was published at a scale of 1:250 000. This map is called "Recommended High Priority Mineral Resource Protection Areas, Proposed Niagara Escarpment Planning Area (PNEPA), Preliminary Map 2399". The map is available to interested parties through the Public Service Centre at Whitney Block, Queen's Park, Toronto, where it can be purchased.

Following are some geological and mineral resources inputs that were made by the Regional and District staff:

- District Strategy,
- Township of Hope,
- Town of Caledon, Region of Halton,
- South Cayuga Waste Disposal Site,
- Regional Niagara Sand and Gravel Supply and Demand Study,
- Woodend and Smithville Conservation Areas,
- City of Cambridge,
- City of Waterloo,
- Whitchurch-Stouffville,
- Georgina and Richmond Hill.

Consultation and Educational Services

The Regional Office at Richmond Hill and five District offices at Cambridge, Midhurst, Lindsay, Maple, and Fonthill continued providing consultation related to geology and mineral resources legislation. The District Office at Lindsay again reported an increase in inquiries pertaining to mineral rights, prospecting, and claim staking procedures. The District staff made considerable input to the Aggregate Sources list of the Ontario Ministry of Transportation and Communications. The Niagara District provided geological assessment of proposed facilities of Ontario Hydro near Lake Erie.

Public and consultant services were provided to: the Ontario Ministries of Transportation and Communications, Housing, and Labour; Conservation Authorities; Ontario Hydro; local/regional municipal governments, and the Niagara Escarpment Commission. The nature of consultations included mineral resource potential, oil and gas potential, identification of rock and mineral samples, claim staking, watertable problems, and the availability of geological and mining literature. Students, as usual, required information and assistance in preparation of project reports relating to geology and mineral resources. Several inquiries related to proposed mineral resources legislation, the Mining Tax Act and the Ontario Mineral Exploration Program (O.M.E.P.) were received.

Pits and Quarries

The Regional Geologist provided input and consultation to proposed mineral policies and other related matters as and when necessary. Keysort, the system for storing and sorting licenced pit and quarry data, has been updated, and is in place in the Regional Office.

Property Examinations

The Regional Geologist re-examined some of the recommended mineral resource protection areas within the proposed Niagara Escarpment Area as to their suitability for future production of aggregates. The District geologists have also been involved in field examination of both licenced and unlicenced aggregate resource areas. Possible new areas for sandstone production have also been examined by the Regional Geologist and the Cambridge District Geologist. Some of the properties visited are described below:

Rice and McHarg Quarries Limited, Lot 21, Concession 5, Town of Halton Hills

Whirlpool Sandstone has been quarried at this site for some time. The stone was depleted in the originally licenced area of 8.4 acres and an additional 13.36 acres were licenced for production in October 1981.

This quarry has been described in detail by Hewitt in 1964. (Hewitt 1964) Flat lying to gently dipping beds of sandstone varying from 2 to 4 feet in thickness and reaching a maximum thickness of 6 feet extend into the additionally licenced area.

Investigations indicate that these resources would extend into the fields east and south of the present operation where overburden is not as thick as in the west. The extraction methods have not changed significantly over the years.

Century Quarries Limited Lot 22, Concession 5, Town of Halton Hills

This site, formerly called the Cohoon quarry, a 4.8 acre site is licenced for extraction in Whirlpool Sandstone. It lies immediately north of the Rice and McHarg Limited operation. Pumping is required to expose the working face (3 to 5 feet) and as at the Rice and McHarg site, 6 to 15 feet of overburden must be removed. Only a small quantity of stone remains in the 100-foot long face along the northern limit of the property.

Field investigations indicate these resources extend northward into adjacent properties with an overburden of about 10 to 20 feet of which about 10 to 15 feet is gravel and sand. Portions of the licenced property have been rehabilitated by construction of ponds with attractive retaining walls.

Smithson Quarries, ½ Lot 26, Concession 8, Town of Halton Hills

This 100 acre licenced property has been opened since Hewitt's 1964 review of sandstone quarries (Hewitt

1964). A 5-foot thick sandstone bed is quarried at the site. This bed lies under about 10 feet of till and 8 to 10 feet of limestone and shale units. The overburden varies from 15 to 20 feet in thickness.

The sandstone resource has been depleted within the approved extraction area. An approval for the removal of western setbacks has been obtained by the operator. The extraction could now continue at this site for two to three more years. Geological investigations indicate additional resources in the west of the current operation with moderate overburden.

Mining and Related Industrial Activity

The Central Region is still the leading producer of structural materials in Ontario. Mining activity in this region mainly comprises of the extraction of sand and gravel, shale, dolostone, limestone, sandstone, gypsum, peat, and some gold. Operations continued during 1981 at the three gypsum mines. Westrock Industries Limited operated a mine near Drumbo; the Canadian Gypsum Mines Limited at Caledonia; and the Domtar Construction Materials Limited at Hagersville. A small amount of gold was recovered from the Cordova Mines in Belmont Township, by Lasir Gold Incorporated.

The number of licenced operations under the Pits and Quarries Control Act, 1971, totalled 884 in 1981. This is an increase over last year, when the licenced operations numbered 851. Generally, the depressed level of construction activities and increased costs of fuel and transportation in 1980, reflected on the demand for aggregate resources. Total aggregate production for 1980 is estimated at 57.3 million tonnes for Central Region, down from the 1979 production of 62.0 million tonnes (source: District Offices, Central Region).

Following are highlights of some of the operations in Central Region. The information is provided by respective companies.

Franceschini Brothers Aggregates Limited, Mississauga

The company reported in its Annual Report: 1981 has been a reasonably good year for us. Market conditions, because of the slump in the economy, took a slight down turn and we found ourselves in a very competitive situation. Some of our smaller customers were forced out of business and others reduced their requirements which greatly affected our production. In addition, one of our properties became fully depleted during the year which forced us to draw material from a more distant source.

Expansion as always, is being considered, but restrictions and locating a source close to our marketing areas create serious problems. As previously mentioned, we did lose one site to depletion and this has put a strain on the remaining sites—expansion and location of new sites is fast becoming of great concern. We are continually upgrading our equipment but have no plans for major purchases in 1982.

Our advantage has always been that no matter what was being built, be it roads, schools, houses, apartments, bricks, concrete blocks, etc., our product was a necessity. We are expecting a below average year in 1981, but we are confident the situation will improve.

Steed and Evans Limited, Kitchener

The company reported:

Bridgeport Pit—This pit is almost depleted, we are now in the process of backfilling. This year, topsoil was hauled in and levelled and 3.28 hectares of agriculture land was sown into spring wheat.

Heidelberg Pit—A berm along Regional Road #17 was completed and a section of land beside the settling pond was built up and topsoil was seeded. Trees were also planted in this area.

Fonthill Pit—The four additional fairways that were completed over the last two seasons were seriously eroded by the heavy rains last spring and late summer. These were rebuilt and seed this year.

We are still awaiting the outcome of our appeal with the O.M.B. in regards to obtaining approval for our new pit at Fonthill.

Overall, we are still feeling the effects of the economic slump within the building industries and look forward to the future with high hopes.

Port Colborne Quarries Limited, Port Colborne

The company reported:

The year 1981 has proven itself (to date) as one of questionable market strengths for both domestic, and especially export sales for limestone.

The Quarry has applied for licensing a 32 acre expansion adjacent to our present operation. The expansion will yield 22 acres of extraction and 10 acres will be used for buffering (set backs and berms) a residential area next to the Quarry.

The Quarry is presently reviewing a secondary screening operation to handle our dust with chip by-product — approximate cost \$150 190 000.

TABLE 1 LICENCED PITS AND QUARRIES IN THE CENTRAL REGION

DISTRICT	LICENCED QUARRIES	LICENCED PITS
Maple	10	149
Huronian	10	177
Niagara	17	15
Cambridge	27	211
Lindsay	14	254
TOTAL	78	806
TOTAL LICENCED PROPERTIES	884	

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TABLE 2 REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATIONS IN CENTRAL REGION

HURONIA DISTRICT			
TOWNSHIP	1978	1979	1980
	TONNES	TONNES	TONNES
Adjala	575,945	560,640	657,294
Amaranth	62,980	35,001	34,621
Essa	51,215	36,922	34,038
Flos	204,927	225,072	169,481
East Garafraxa	259,763	243,035	264,603
West Gwillimbury	44,824	23,587	20,978
Innisfil	186,905	172,365	220,669
Mara	201,266	586,222	610,970
Matchedash	6,486	3,810	4,940
Medonte	134,653	211,374	178,901
Melancthon	36,288	59,421	37,923
Mono	342,731	547,848	638,355
Mulmur	77,722	66,950	49,673
Nottawasaga	318,803	304,814	269,653
Orillia	2,105,239	2,139,412	1,902,071
Oro	353,326	338,742	389,247
Rama	50,259	64,954	83,284
Sunnidale	248,261	237,138	269,037
Tay	652,181	552,929	595,976
Tecumseth	61,096	113,035	51,744
Tiny	206,670	209,922	240,256
Tosorontio	95,663	79,923	73,428
Vespra	389,239	404,785	341,644
TOTALS	6,666,442	7,217,901	
CAMBRIDGE DISTRICT			
Brantford	1,486,207	1,180,802	1,194,374
South Dumfries	277,527	14,729	29,767
Onondaga	3,312	-	2,155
Ancaster	172,923	125,210	104,084
Flamborough	2,984,230	2,675,946	2,819,814
Stoney Creek	566,923	398,695	456,753
Blenheim	205,363	152,497	124,132
Waterloo: Kitchener, Cambridge, Woolwich		1,634,904	-
North Dumfries	1,067,858	1,042,262	689,285
Wellesley	854,966	1,105,585	624,516
Wilmet	106,507	260,204	175,691
Woolwich	593,327	224,839	363,079
Arthur	120,024	145,813	90,771
Maryborough	26,076	64,308	44,711
Peel	64,848	7,558	1,466
Nichol	-	-	-
Pilkington	538,364	376,876	296,736
West Luther	61,990	-	34,271
West Garafraxa	51,922	54,011	54,663
Eramosa	108,635	44,692	90,482
Erin	84,633	131,157	104,528
Guelph (City and Township)	95,156	309,336	336,966
Puslinch	1,621,277	1,951,237	1,646,644
Burlington	2,958,517	2,647,704	1,671,114
Oakville	-	-	-
Milton	4,933,758	4,894,447	5,060,370
Halton Hills	1,878,234	1,981,405	2,731,228
East Luther	39,926	65,902	27,030
Tuscarora	-	-	-
Town of Dundas	-	-	-
Glanbrook	-	-	-
City of Cambridge	426,029	-	31,135
City of Kitchener	918,685	-	833,790
City of Waterloo	21,014	-	-
TOTALS	22,268,231	21,490,119	19,639,555

TABLE 2 REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATIONS IN CENTRAL REGION

MAPLE DISTRICT			
TOWNSHIP	1978	1979	1980
	TONNES	TONNES	TONNES
Brock	1,143,895	888,276	1,129,096
Pickering	373,025	440,234	401,330
Uxbridge	3,116,892	2,936,263	3,311,433
East Gwillimbury	213,108	194,644	131,120
East York	94,944	92,740	81,674
Georgina	328,798	283,011	342,338
King	273,220	504,478	276,605
Markham	-	-	-
Richmond Hill	14,928	12,254	115,475
Vaughan	1,532,562	1,296,996	974,600
Whitchurch-Stouffville	3,481,113	3,460,373	3,084,030
Brampton	1,594,186	1,522,937	1,690,587
Caledon	4,761,492	4,483,290	4,741,840
Mississauga	646,908	602,572	586,314
TOTALS	17,575,071	16,718,068	16,866,442
LINDSAY DISTRICT			
Alnwick	39,100	79,719	49,099
Asphodel	333,857	372,416	368,496
Belmont	344,117	432,579	359,108
Bexley-Carden	226,596	340,616	359,568
Cavan	114,211	72,305	51,895
Douro	29,464	48,802	101,114
Dummer	228,462	215,227	159,272
Eldon	39,490	39,898	86,721
Emily	306,157	273,770	334,054
Ennismore	84,628	113,939	95,665
Fenelon	463,315	649,055	465,199
Haldimand	130,102	134,099	263,379
Hamilton	303,300	241,549	366,016
Harvey	91,194	114,888	96,362
Hope	64,115	59,955	66,861
Manvers	1,556,037	1,318,732	1,527,349
Mariposa	332,839	226,802	255,808
Town of Newcastle:			
Former Twp. of Clarke	442,128	482,774	202,754
Former Twp. of Darlington	1,201,102	1,249,047	1,158,720
North and South Monaghan	74,724	12,150	29,778
Ops	-	22,620	4,463
City of Oshawa	-	60,640	18,177
Otonabee	161,546	91,147	90,412
Scugog:			
Former Twp. of Cartwright	365,186	249,535	118,630
Former Twp. of Reach	796,887	1,023,317	629,636
Smith	361,365	339,896	506,059
Verulam	288,767	314,942	420,777
Whitby	408,577	250,548	173,437
TOTALS	8,787,266	8,830,967	8,358,809
NIAGARA DISTRICT			
Town of Dunnville	358,547	367,555	269,686
Town of Fort Erie	476,272	1,389,506	357,271
Town of Haldiman	1,182,061	1,334,534	960,196
Town of Lincoln	1,065,034	-	844,910
City of Niagara Falls	943,471	818,922	10,527
Town of Niagara-on-the-Lake	484,436	331,841	377,262
Town of Pelham	726,654	710,553	678,682
City of Port Colborne	1,325,396	1,244,458	277,555
Township of Wainfleet	430,005	406,826	512,080
City of Thorold	-	-	1,037,119
TOTALS	6,991,876	6,604,195	5,325,288

Sources: MNR District Offices of Central Region

TABLE 3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED IN 1981

Location	Lot & Conc.	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File #	Local File #
Belmont Twp. Peterborough Cty.	Lot 23 Conc. 6	Harnden & King	-	Assess.	DDH-202	1981	DDR#21	5884.18

TABLE 4 MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

<u>Ontario Geological Survey Reports</u> MP 100	<u>Coloured Maps</u>
<u>Open File Reports</u> OFR 5331 OFR 5349	<u>Northern Ontario Engineering Geology Terrain Studies Reports</u>
<u>Preliminary Maps - Geological Series</u> P. 2399 P. 2400 P. 2401 P. 2402 P. 2403	<u>Northern Ontario Engineering Terrain Studies Maps</u>
<u>Preliminary Maps - Data Series</u>	<u>Mineral Resources Branch Publications</u> MPBP 12 MPBP 13
<u>Aggregate Resources Publications</u> ARIP 14 ARIP 27 ARIP 31 ARIP 37 ARIP 21 ARIP 28 ARIP 32 ARIP 38 ARIP 23 ARIP 29 ARIP 34 ARIP 39 ARIP 25 ARIP 30 ARIP 35 ARIP 40 <u>Federal - Provincial Maps</u> ARIP 36 ARIP 42	<u>Miscellaneous Reports</u> Occasional Paper 7
	<u>Geological Survey of Canada Open File Reports</u>

Steeley Industries Limited Minerals Group, Hamilton

The company reported: 1981 was a slow year caused mainly by a down turn in construction activity and the Stelco strike.

We expect to quarry about 2.3 million tonnes of stone and remove about 1.2 million yards of overburden.

We expect to return about 30 acres of back-filled quarry to agricultural use.

We are planning to start opening up a new quarry site across the 4th Concession as we will be out of stone in the existing quarry by the first quarter of 1985.

Staking and Exploration Activities

No new mining claims were recorded in the Lindsay District in 1981. Four mining claims in Belmont Township

were cancelled. Presently, there are eleven mining claims in Belmont Township, eight mining leases, two patented mining claims, and six licences of occupation, all for mineral rights only. Four mining claims were converted to mining leases and another four are in the process of being converted to mining leases.

Two leases in lot 31, concession 6, Belmont Township, on a calcium deposit are held by Northumberland Mines Limited. Mr. Kelley O'Connor, Exploration Manager for Preussag, reported (personal communication D. Billings, District Geologist, Ontario Ministry of Natural Resources, Lindsay District) that the Company spent \$128 000 on a diamond drilling and metallurgical testing program. Mr. William Young, President of Northumberland Mines, reported (personal communication, D. Billings) that his company is conducting an additional study with the Ontario Research Foundation pertaining to reduction of silica and improving brightness. Northumberland Mines Limited is exploring possibilities for production from its property.

Harnden and King (Regional Geologists Files, Ontario Ministry of Natural Resources, Richmond Hill) reported assessment activity for two claims in lot 23, concession 6, Belmont Township. Two holes were drilled to a depth of 101 feet and their core samples were logged (Assessment Files, Ontario Ministry of Natural Resources, Richmond Hill). No other activity was reported.

Recommendations for Exploration

Current geological information indicates additional resources of Whirlpool Sandstone (excluding currently licenced areas) in the Georgetown-Inglewood area. These resources could be explored for their suitability and availability of extraction.

Historically, the mineral production in the Region has included clay, shale, limestone, dolomite, sandstone, gypsum, marl, granite, traprock, peat moss, iron, and gold. It is believed that opportunities may exist for renewed or new development of some of these resources in view of the current geological information and interest in developing Ontario based resources. Northern fringes of the Region, in particular, deserve attention for uranium, base metals, precious metals, and industrial minerals.

Regional Geological Evaluation Projects

Abandoned Pits and Quarries Studies

About 75 percent of Lindsay District has now been covered by the study. Approximately 1200 abandoned pits and quarries have been identified so far. Huronia District's study is still incomplete; during the year the District staff completed the township of Tecumseth and half of the township of Adjala.

Licensed Operations Studies

All Districts are working towards re-evaluation of possible aggregate resources in the unextracted portions of the licenced operations.

District Strategy

All draft strategies for the Districts were completed earlier this year and the second revised draft is now being reviewed in the Region.

Sandstone Resources of the Cambridge District

During the year a sandstone resource evaluation study was initiated through the Cambridge District. Ted Har-

vey, the District Geologist is carrying out the study and preparing a report, which is in the final stage and will be available in early 1982. Several field surveys were conducted to determine the location of sandstone resource and possible depth of overburden.

Township Aggregate Inventory Papers

The Aggregate Assessment Office, Ontario Geological Survey, has published a total of 38 papers on townships in the Central Region.

Central Region Mineral Inventory

An inventory of mineral resources in the Central Region is attempting to point out opportunities for increased mineral development. The study is concerned primarily with industrial minerals but also includes certain metallic resources and peat moss. Mineral aggregates for the construction industry are excluded from the study.

Seismic Surveys

Seismic surveys were initiated under technical direction of Thompson, Regional Mines Coordinator, in Niagara, Cambridge, and Huronia Districts to study stratigraphy, resource and overburden characteristics of surface materials. The District staff conducted these surveys with technical support from the Region. Jim Scharlach and Frank Orleck, Pits and Quarries Inspectors from Cambridge District, worked on the field crews along with the Experience '81 students.

Public Awareness Program

Lindsay District staff gave presentations on geology and the mineral resources program to Junior Rangers and 200 land use planning students of Sir Sandford Fleming College. Tours of operating pits and quarries were organized for District staff and Junior Rangers. A presentation was made to the Fish and Wildlife Section of Lindsay District to explain protection and safety at inactive pits and quarries. The District staff also participated in a public meeting in Manvers Township and a radio program on CKLY, Lindsay, to discuss the mineral resources program.

A tour of 3M Canada operations near Havelock was organized by Lindsay District with the cooperation of 3M Canada management for Regional, District, and Main Office staff of the Ministry.

Tours to show licenced operations and geology in Huronia, Maple, Lindsay, and Cambridge Districts were organized by the Industrial Minerals Section in cooperation with the Region for members of the Association of Counties and Regions of Ontario.

Niagara District staff hosted an Industrial Minerals Section display at Geo-Venture '81 at Brock University, St. Catharines.

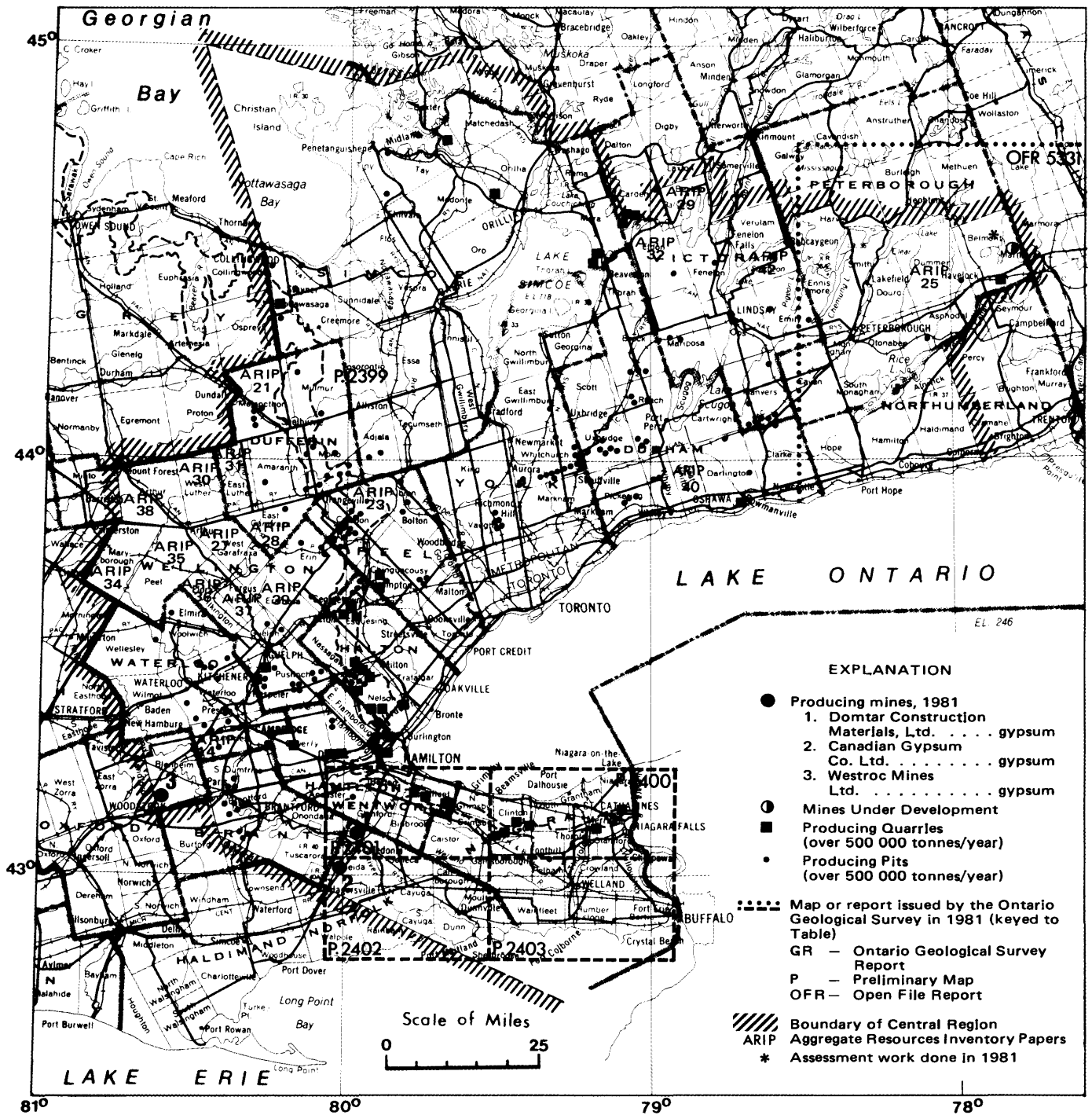


Figure 1
CENTRAL REGION

The Engineering and Terrain Geology Section of the Ontario Geological Survey organized six seminars pertaining to glacial deposits of Ontario at Toronto.

The Ontario Geological Survey staff gave various talks to the Brantford Minerals Club, the Toronto Junior Field Naturalists, and the Toronto Field Naturalists. During the summer, a tour of the Ontario Geological Survey was organized for Pakistani delegates. Various displays and exhibits were given by individual sections of the Ontario Geological Survey for:

- (a) The American Association for the Advancement of Science,
- (b) the Prospectors and Developers Convention,
- (c) the Sportsman Show—production of energy by minerals (peat, coal, lignite, and natural gas),
- (d) Canadian Mining and Aggregate Equipment Exhibition,
- (e) For individual companies.

The Ontario Geological Survey also organized a Geo-Science Seminar and displays in the month of December at Toronto. The Precambrian Geology Section and the Geoscience Laboratories put up new displays illustrating their work, at the offices of 77 Grenville Street in Toronto. The Ontario Government Bookstore held a one week display of popular Ontario Geological Survey publications in their building on Bay Street, Toronto.

The Ontario Geological Survey once again organized the annual Toronto minerals classes. The average nightly attendance was 205 people, but the registration exceeded 300 people.

Activities of the Ontario Geological Survey

J.R. Bartlett and J.M. Moore re-examined several localities in: Methuen and Belmont Townships, Peterborough County; and Marmora Township, Hastings County, that were originally mapped in 1980. This study was conducted to gain a better understanding of the stratigraphy of the area.

M.S. Bourque mapped the sedimentation and stratigraphy of carbon metasediments in the Grenville Supergroup to gain a general and regional overview of the supracrustal rocks, especially carbonates and related sedimentary rocks.

P.F. Finamore mapped the Quaternary geology of the Orillia Area, Victoria and Simcoe Counties.

M.J. Batterson conducted Quaternary geology field mapping to describe the nature and extent of Quaternary deposits, and to identify and measure indicators of ice flow to determine glacial history and stratigraphy.

The staff of the Aggregate Assessment Office conducted an Aggregate Resources Inventory Study in the Regional Municipality of Halton and in Simcoe County. The purpose of this study was to locate aggregate deposits, pits, and highest aggregate resource areas. In Simcoe County, the dominant gravel bearing feature is

the Bass Lake Kame Moraine on the southern boundary of Medonte Township.

B.S. Goldstein carried out field mapping of Quaternary surficial deposits in the Bannockburn area (1:50 000 map sheet area). This map-area covers parts of Belmont, Dummer, and Chandos Townships in the Peterborough Area.

Ian Thomson and E.A. Boni began regional geochemical mapping, sampling, and analysis of stream sediments from tributary drainages in Southwestern Ontario. About 20 000 km² of regional geochemical mapping was completed in July and August of 1981. The western part dealt mainly with London and the eastern part covered Hamilton and the Niagara Peninsula.

P.B. Thomas and M.E. Cherry carried out detailed mapping in the Cordova Mines area to determine relationships between mineralizations and mineralogical, geochemical, structural, and textural variations.

Geoscience Research

R. Nadon and J.E. Gail, of the University of Waterloo, continued conducting a field, laboratory, and numerical modelling study to determine the impact of groundwater on surface mining activities in the Niagara Escarpment area (Nadon and Gail 1980-81). The field site is located near Dufferin Quarry, 8 km north of Milton, Ontario.

J.C. Roegiers and R.H. Mills, of the University of Toronto, are researching the cohesion in compacted shales and the variation of strength caused by water-solid interaction (J.C. Roegiers and Mills 1980/81). The research site is located in the Burlington area, on Queenston Shale.

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1981 Report of the Southwestern Regional Geologist

P.A. Palonen¹, Rae Booth-Horst², and B.H. Feenstra³

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Introduction

Personnel of Southwestern Region are responsible for Petroleum Resources within the whole province of Ontario as well as for the Mineral Resources program within the Southwestern Region. Staff are located at two offices, the Southwestern Regional office at 1106 Dear-

ness Drive and the Petroleum Resources Laboratory at 458 Central Avenue.

Permanent staff at 1106 Dearness Drive are: S. Keen, Section Supervisor; G. Tanton, Engineering Technologist; P. Wright, Geological Assistant; L.R. Laceby, Senior Draftsman; I. Cameron, Draftsman; and Anne Marie Martyniuk, Secretary. R. Rybansky assumed the position of Reservoir Engineer in January, 1981.

Personnel at the Laboratory are P.A. Palonen, Chief Geologist; Rae Booth-Horst, Senior Petroleum Geologist; B.H. Feenstra, Mineral Resources Geologist; Cathy Hesselmanns, Secretary and Computer Operator; and M. Campbell, Laboratory Technician.

Petroleum Resources Inspectors responsible for the enforcement of the Petroleum Resources Act, and Pits and Quarries Inspectors responsible for the enforcement of the Pits and Quarries Act, are located at various District Offices.

Regional Geologist's Office Activities

Petroleum Resources Geological Activities

Response to requests for information and background material on hydrocarbon exploration and production in Lake Erie a seminar and field trips were organized for June 22nd and 23rd 1981. Representatives from the Petroleum Resources Section and Legal Services Group of the Ontario Ministry of Natural Resources met with representatives of the State Geologist's Office, Division of Oil and Gas Regulations and Chief of Mineral's Office for Pennsylvania; Division of Oil and Gas for Ohio; and the Bureau of Mineral Resources Regulatory Section and Offshore Development Section for New York. Personnel from industry representing Underwater Gas Developers, Consumers Gas Limited, Pembina Exploration, and the Ontario Ministry of the Environment were also in attendance.

Papers describing various aspects of natural gas exploration and production from offshore Lake Erie between 1913 and 1981 were presented by Petroleum Resources Section personnel. These included:

- Legislation and the International Joint Commission by S. Keen,
- Exploration, production, licensing, leasing, and expenditure credits by P. A. Palonen,

¹Chief Geologist and Regional Geologist, Ontario Ministry of Natural Resources, London.
²Senior Petroleum Geologist, Ontario Ministry of Natural Resources, London.
³Mineral Resources Geologist, Ontario Ministry of Natural Resources, London.

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Ontario Well Data System data collection and dissemination by Rae Booth-Horst,
Regulatory environmental and safety inspection by G. Crewe.

A paper entitled "Correlation of Upper Ordovician (Ashgillian) Biostromes of Manitoulin Island, Ontario" was presented by Rae Booth-Horst at the Canadian Biostratigraphic Conference on Manitoulin Island in September, 1981.

The publication series formerly entitled Petroleum Resources Section Papers has been reorganized into a new series called Oil and Gas Papers:

A map entitled "Oil and Gas Pools and Pipelines Map—Southwestern Ontario" at a scale of 1:250 000 was completed. This map, a revision of Map 69-1, shows the locations and boundaries of all known present and past-producing reservoirs in Southwestern Ontario. The collecting and main transportation pipelines current to the end of 1981 are also shown, although symbols for individual well locations have been omitted. The revised map is scheduled for release prior to April 1982.

An annual status report on petroleum exploration in eastern Canada in 1980 was compiled and written for the American Association of Petroleum Geologists. This report summarized activity in Ontario and the east coast showing exploration and production trends. A limited number of reprints are available from the Petroleum Resources Laboratory.

Maps showing structural contours at a scale of 1:250 000 for Precambrian, Cambrian, and Ordovician forma-

tions based on well data from Southwestern Ontario are presently being prepared. These form part of a doctoral study by Rae Booth-Horst at the University of Western Ontario. The study involves stratigraphy, geochemistry, and structure of the Cambrian and Ordovician section of Southwestern Ontario, related to oil and gas exploration. Other expected results are isopachous maps of Cambrian and Ordovician formations, detailed geological descriptions of Cambrian and Ordovician pools, detailed descriptions of over 1000 wells, and determination of faults using trace elements.

In conjunction with the Ontario Geological Survey, Data Series maps at the scale of 1:100 000 were compiled. These maps, to be published early in 1982, show the location of all geophysical and geochemical surveys (including seismic) which were performed annually in 1978 and 1979. The scheduled date of release for this series is early 1982. The base maps are photo reductions of the current NTS series showing well locations in southwestern Ontario.

During 1981, metrication and final documentation of the Ontario Well Data System (OWDS), which stores field, production, and geological data on over 12 600 wells in Ontario, was completed. The data base is current to the end of 1980. Data from the computerized base is available to the public for the retrieval cost. Map compilation of structural and isopachous data can also be produced. A set of approximately 1200 well cards for all wells in Southwestern Ontario penetrating rocks of Precambrian, Cambrian, or Ordovician age as well as a complete set of approximately 1200 well cards for wells

TABLE 1 | MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

Ontario Geological Survey Reports

Open File Reports

Preliminary Maps - Geological Series

P. 2396 P. 2438
P. 2399 P. 2453
P. 2435 P. 2454
P. 2436 P. 2455
P. 2437

Preliminary Maps - Data Series

Aggregate Resources Publications

Federal - Provincial Maps

Coloured Maps

Northern Ontario Engineering Geology Terrain Studies Reports

Northern Ontario Engineering Terrain Studies Maps

Mineral Resources Branch Publications

IMBP 1; Occasional Paper No. 7

Miscellaneous Reports

MP 98
MP 100

Geological Survey of Canada Open File Reports

Miscellaneous Publications

Oil and Gas Paper 1
Oil and Gas Paper 2

TABLE 2: SUMMARY OF WELL COMPLETIONS FOR 1981 (TO DEC. 5, 1981 INCLUSIVE)

COUNTY & TOWNSHIP	EXPLORATORY					DEVELOPMENT					OTHER	
	Gas	Oil	Dry	Total	Metres	Gas	Oil	Dry	Total	Metres	Total	Metres
ELGIN	-	-	6	6	3126.7	6	-	11	17	9951.1	-	-
Aldborough	-	-	1	1	1244.5	-	-	2	2	1407.7	-	-
Dunwich	-	-	2	2	381.0	-	-	1	1	520.4	-	-
Lake Erie	-	-	1	1	614.5	6	-	8	14	8023.0	-	-
Yarmouth	-	-	2	2	886.7	-	-	-	-	-	-	-
ESSEX	-	-	1	1	535.0	-	-	2	2	1104.0	2	824.3
Anderdon	-	-	-	-	-	-	-	-	-	-	1 brine well	376.6
Gosfield S.	-	-	-	-	-	-	-	-	-	-	-	-
Lake Erie	-	-	1	1	535.0	-	-	-	-	-	-	-
Malden	-	-	-	-	-	-	-	1	1	747.0	-	-
Sandwich W.	-	-	-	-	-	-	-	-	-	-	1 P.P.Stg.	452.7
HALDIMAND	4	-	8	12	5751.5	23	-	21	44	17253.6	-	-
Lake Erie	4	-	8	12	5751.5	20	-	21	41	16641.3	-	-
Canborough	-	-	-	-	-	1	-	-	1	212.4	-	-
Moulton	-	-	-	-	-	1	-	-	1	207.3	-	-
N. Cayuga	-	-	-	-	-	1	-	-	1	192.6	-	-
HURON	-	-	-	-	-	-	-	-	-	-	1 re-entry	91.3
Goderich	-	-	-	-	-	-	-	-	-	-	1 re-entry	91.3
Town of Goderich	-	-	-	-	-	-	-	-	-	-	34 freeze holes	(95 m each)
KENT	3	-	2	5	3163.5	2	1	4	7	2898.0	-	-
Camden	-	-	-	-	-	-	-	1	1	131.0	-	-
Lake Erie	3	-	1	4	1968.5	2	-	1	3	1943.0	-	-
Harwich	-	-	1	1	1195.0	-	-	-	-	-	-	-
Tilbury E.	-	-	-	-	-	-	1 Susp	-	1	559.0	-	-
LAMBTON	-	2	19	21	13560.9	2	8	4	14	6004.9	6	3971.7
Brooke	-	1	2	3	1935.0	-	-	-	-	-	-	-
Dawn	-	1	1	2	1183.0	-	1	1	2	1263.1	1 Brine	228.8
Enniskillen	-	-	3	3	1973.0	-	7	-	7	1024.3	-	-
Euphemia	-	-	3	3	805.9	-	-	1	1	574.0	-	-
Moore	-	-	3	3	2371.0	-	-	-	-	-	5 Brine	2994.1
Plympton	-	-	6	6	4585.0	-	-	2	2	1538.5	-	-
Sarnia	-	-	-	-	-	2	-	-	2	1605.0	-	-
Warwick	-	-	1	1	708.0	-	-	-	-	-	-	-
LINCOLN	-	-	-	-	-	5	-	-	5	807.3	-	-
Gainsborough	-	-	-	-	-	5	-	-	5	807.3	-	-
MIDDLESEX	-	-	1	1	495.0	-	-	-	-	-	-	-
McGillivray	-	-	1	1	495.0	-	-	-	-	-	-	-
NORFOLK	-	-	1	1	613.0	28	-	11	39	17941.6	-	-
Charlotteville	-	-	-	-	-	5	-	1	6	2358.5	-	-
Houghton	-	-	-	-	-	2	-	-	2	537.0	-	-
Lake Erie	-	-	1	1	613	8	-	10	18	9529.1	-	-
S. Walsingham	-	-	-	-	-	11	-	-	11	4835.1	-	-
Woodhouse	-	-	-	-	-	2	-	-	2	681.9	-	-
WELLAND	-	-	-	-	-	2	-	-	2	373.9	-	-
Wainfleet	-	-	-	-	-	2	-	-	2	373.9	-	-
MANITOULIN ISLAND	-	-	-	-	-	-	-	-	-	-	5	184.6
Burnt Island	-	-	-	-	-	-	-	-	-	-	5 strat. tests	184.6
TOTALS	7	2	38	47	27245.6	68	9	53	130	56333.0	14+ 34 freeze holes	5071.9+ (3230m freeze holes)

Lost Holes: 5 (986.5m)

Total: 196 (with lost holes) = 89637 m
230 (with freeze holes) = 92867 m

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drilled in Lake Erie were generated. Sets of these records may be purchased from the Petroleum Resources Laboratory.

Petroleum geologists at the Laboratory also perform administrative, enforcement, and consultative duties. The Petroleum Resources Laboratory receives approximately 1000 visitors annually.

Mineral Resources Activities

Mineral resources activities in Southwestern Region generally centred around act administration and enforcement duties. Technical input was also made to land use plans concerning Grey-Owen Sound, East Williams, and Central Perth Official Plans, Backus Tract, Staffa Kame Complex. District strategies, aggregate resources inventories by the Ontario Geological Survey (south Grey, Artemisia, East Zorra-Tavistock, Norwich) were monitored and consultative services to other provincial and federal agencies, consultants, and the public in general were provided. Some field and laboratory work was carried out in the evaluation of aggregate resources for the Hullett Wildlife Management Area. Several decorative stone quarries and other mineral producing industries related to the manufacture of float glass in the Owen Sound-Wiarton area were also visited together with staff of the Industrial Minerals Section, Mineral Resources Group, and the Owen Sound District Office.

Ontario Geological Survey Activities

Precambrian Geology Section

Dr. A. Turek of the University of Windsor was contracted by the Precambrian Geology Section of the Ontario Geological Survey to study the Precambrian basement of Southwestern Ontario. The final product of this study will be 1:250 000 and 1:100 000 scale structural maps as well as a lithofacies map of the Precambrian surface based on samples from deep exploration wells.

TABLE 3: LAKE ERIE DRILLING 1981

COUNTY	EXPLORATORY				DEVELOPMENT			
	Gas	Dry	Total	Metres	Gas	Dry	Total	Metres
Elgin	-	1	1	614.5	6	8	14	8023
Essex	-	1	1	535.0	-	-	-	-
Haldimand	4	8	12	5751.5	20	21	41	16641.3
Kent	3	1	4	1968.5	2	1	3	1943.0
Norfolk	-	1	1	613.0	8	10	18	9529.1
TOTAL	7	12	19	9482.5	36	40	76	36136.4
Total =			95	(45618.5m)				
Lost Holes =			3	(464.5m)				
Grand Total =			98	(46083.4m)				

Engineering and Terrain Geology Section

During 1981, a study of the Paleozoic geology of the Windsor-Essex and Pelee Island area was completed by P.G. Telford and D.J. Russell resulting in publication of Preliminary Map P.2396 (A. Figure 1).

The subsurface Sylvania sandstone in the Windsor area was the topic of an investigation begun in 1980 under the direction of P.G. Telford. A report is presently in preparation and results should be published early in 1982 (B. Figure 1).

During 1981, the Engineering and Terrain Geology Section began an evaluation of the potential of oil shales in Southwestern Ontario. The first phase of the project was to generate by computer, preliminary 1:250 000 scale structural and isopachous maps of the Collingwood, Kettle Point, and Marcellus Formations of Southwestern Ontario. Preliminary structural maps were generated by staff of the Petroleum Resources Section and are being modified by the Ontario Geological Survey. A drilling program to evaluate the potential of the Collingwood Formation has been outlined and should begin early in 1982.

E.V. Sado completed mapping the surficial geology of the Chatham-Wheatley area (C. Figure 1). Preliminary maps showing drift thickness and bedrock topography of this area have been published (Table 1, P.2435-2438). The bedrock topography of part of this area was also recently outlined on the basis of seismic surveys by Gagné (1981). In the Chatham-Wheatley area, surficial deposits of sand and gravel aggregate are scarce and generally of poor quality. The search for buried deposits of sand and gravel in this area, aided by drilling and geophysical tools, has resulted in identification of several aggregate deposits with commercial possibilities.

Staff of the Aggregate Assessment Office, Ontario Geological Survey, conducted field investigations in the London, Middlesex (townships of Delaware, North Dorchester, Westminster, West Nissouri), Woodstock, Norwich, Southwest Oxford and Grey (townships of Bentinck, Glenelg, Normanby, Egremont) areas. Twenty-eight test holes were drilled to an average depth of 10 m in the south Grey area with many of the samples showing good quality crushable aggregate. Results of all investigations will be published in several Aggregate Resources Inventory Papers.

Geochemistry Program

A new regional stream sediment geochemical mapping program for environmental and mineral potential purposes was initiated over part of Southwestern Ontario, including Haldimand-Norfolk, Elgin, Middlesex, Oxford, and south Perth and Huron Counties in the Southwestern Region. Field work for the pilot phase of this program has been completed and was carried out by Dominion Soil Investigations Limited and Gartner Lee Associates.

Ontario Geological Survey Research Grants

During 1981, 2 Geoscience Research Grants were awarded for projects to be conducted in Southwestern Region. The first was to Dr. R.F. Mereu of the University of Western Ontario for "A Micro-earthquake Survey of Gobles Oil Field Area of Southwestern Ontario". This study is being further assisted with petroleum reservoir engineering expertise from the Petroleum Resources Section.

The second grant was to Dr. J.F. Barker of the University of Waterloo for "Source Correlation and Thermal Maturation History of Hydrocarbon Mineral Deposits of Southern Ontario". The objectives of this project are to define the source of hydrocarbons trapped in reservoirs in southern Ontario, to correlate deposits of similar origin, and to evaluate the thermal maturation history of the Paleozoic strata and their hydrocarbon deposits.

Oil and Natural Gas

The following preliminary statistics include data obtained from wells drilled between January 1st and December 5th, 1981. The 1981 figures are compared with data for wells drilled from January 1st to December 6th, 1980, as published in the 1980 Report of the Southwestern Regional Geologist. Final figures will be available in "Oil and Gas Exploration, Drilling and Production Summary, 1981" (Oil and Gas Paper 4) to be published in 1983.

Most petroleum and natural gas exploration and development in Ontario was conducted in the Southwestern and Central Regions. Table 2 is a summary of wells drilled in Ontario during 1981 by county and township. A total of 196 wells (including 5 lost holes but not including 34 freeze holes) were drilled in 1981 as compared to 238 wells (including 9 lost holes) in 1980.

This represents a decrease of 18 percent. The total

number of metres drilled decreased 26 percent from 120 701.2 m in 1981 to 89 637 m in 1980.

During 1981, 47 exploratory and 130 development wells were completed showing a decrease of 53 percent in the exploratory class and an increase of 12 percent in the development class as compared to 1980. In addition, 14 holes including one re-entry, 7 brine, 1 petroleum products storage, and 5 stratigraphic tests were drilled.

Offshore drilling statistics for natural gas in Lake Erie are shown in Table 3. Drilling on Lake Erie decreased 23 percent from 124 wells in 1980 (not including 6 lost holes) to 95 wells in 1981 (not including 3 lost holes). By December 6, 1981, 1468 wells had been drilled in Lake Erie.

Of the 95 wells drilled in 1981, 19 were classified as exploratory wells and 76 were classified as development wells of known pools. Offshore drilling was 44 percent successful during 1981 with 43 of 95 wells being producers. A total length of 45 618.5 m of section was penetrated under Lake Erie during 1981, down 30 percent from the 64 745.5 m drilled in 1980.

All of the available gas exploration and production rights continue to be held or are under commitment in Lake Erie. Of the approximately 1.1 million ha available, 279 529 ha are presently under lease, whereas 667 110 ha are under exploratory license of occupation for a total 946 639 ha. The remaining areas are under commitment to Pembina Exploration Company Limited with licenses of occupation scheduled to take effect at the beginning of 1982.

On land, a total of 98 wells including 14 "other" and two lost holes were drilled for a total length of 43 553.6 m. Land wells were 52 percent successful with two of 28 exploratory wells and 41 of 54 development wells being producers. The success of drilling in Ontario onshore and offshore combined for 1981 was 49 percent, up from the 48 percent in 1980. Eleven wells, including two exploratory and nine development wells were completed as oil producers during 1981.

Total oil produced in Southwestern Ontario to November, 1981, inclusive was approximately 73 000 m³,

TABLE 4 AGGREGATE PRODUCTION FROM LICENSED PITS AND QUARRIES DURING THE YEAR.

District	Number of Designated Townships	Number of Licensed Pits and Quarries	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)	Total (Tonnes)
Aylmer	17	172	6 272 905	2 858 397	5 442	9 136 744
Chatham	26	95	1 864 847	2 931 559	29 729	4 826 135
Owen Sound	19	126	1 921 126	243 806	5 986	2 170 918
Simcoe	15	34	559 219	564 624	1 846	1 125 689
Wingham	2	31	528 140	585 947	279 034	1 393 121
TOTALS	79	458	11 146 237	7 184 333	322 037	18 652 607

Sources: MNR District Offices in Southwestern Region

EXPLANATION



- Important Gas Discoveries, 1981**
1. Pembina #1 Lake Erie 69-B
 2. Pembina #2 Lake Erie 353-5
 3. Pembina #4 Lake Erie 70-Q
 4. Pembina #4 Lake Erie 308-B
 5. Pembina #4 Lake Erie 353-H
 6. Pembina #2 Lake Erie 308-W



- Important Oil Discoveries, 1981**
1. Shell Ram Brooke 3-10-IX
 2. Forbes #19 Dawn 8-27-II



- Brine Wells for Salt Recovery, 1981**
1. Dow #67 Moore 24-XI
 2. Dow #68 Moore 24-XI
 3. Dow #66 Moore 24-XI
 4. Allied Chemical G-4 Anderdon 35-1
 5. Dow #65 Moore 24-XI



- Petroleum Products Storage**
1. Dome Storage P-8 Sandwich W. 59-I



- Operating Mines**
1. Domtar Chemical Ltd.
 2. Canadian Rock Salt Co. Ltd.



Map or Report



Boundary of Southwestern Region

Current to November 7, 1981

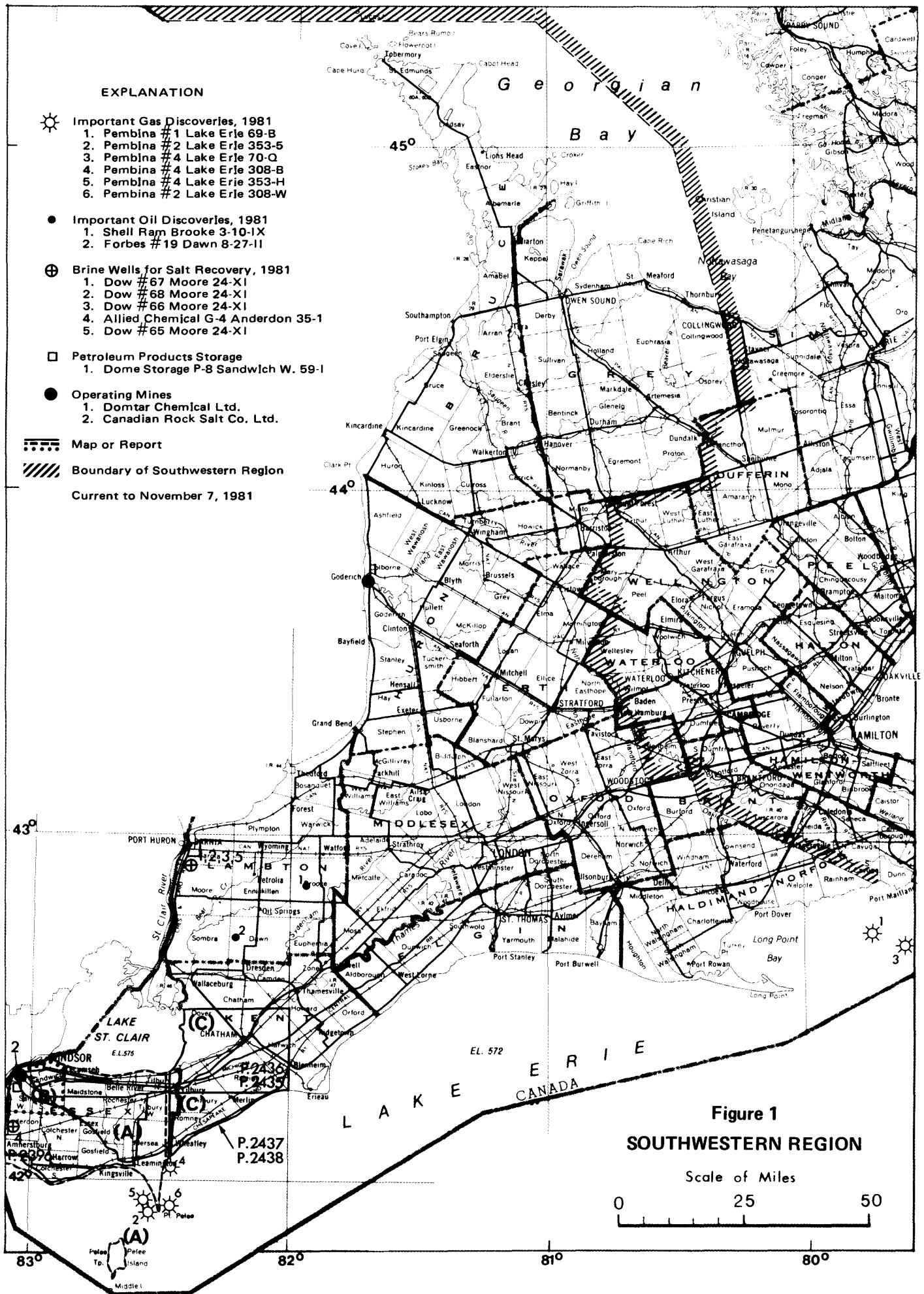


Figure 1
SOUTHWESTERN REGION
 Scale of Miles
 0 25 50

whereas approximately $320 \times 10^6 \text{m}^3$ of gas was produced from January 1, 1981 until September, 1981 (Petroleum Resources Section Files, London). No oil production is permitted from Lake Erie under international agreement.

Industrial Minerals

Aggregates

The total aggregate production from nearly 900 pits and quarries in the Southwestern Region in 1980 is estimated at 29 million tonnes. This estimate includes nearly 19 million tonnes of sand and gravel, stone, clay and shale from 435 licensed pits (426 sand and gravel, 9 clay and shale) and 23 licensed quarries (Table 4). Also included are about 3 million tonnes of sand and gravel from 74 wayside pits, and slightly more than 7 million tonnes of sand and gravel from 362 pits in the 59 undesignated townships. The total aggregate production in 1980 shows a decrease of nearly 4 million tonnes or a 17 percent decline from the 1979 production level.

Much of the construction aggregates produced in the region come from local deposits of sand and gravel, and the remainder is derived from limestone and dolostone bedrock of the Amabel Formation (Owen Sound), Onondaga Formation (Nanticoke), Lucas Formation (Amherstburg), and Dundee Formation (Nanticoke). The Amabel Formation dolostone is also quarried in the Owen Sound-Wiarton area for the production of decorative stone, and dolomite sand is utilized in the local manufacture of float glass.

Much of the stone quarried in Southwestern Region is high-calcium limestone of the Lucas Formation found in the Woodstock-Ingessoll area and at Amherstburg, and limestone of the Dundee Formation found at St. Marys. These valuable limestone deposits are used for the production of lime for flux in the iron and steel industry, or in the manufacture of portland cement and soda ash.

Local deposits of glacial lake clays, and shale bedrock of the Georgian Bay Formation near Meaford and the Hamilton Formation near Arkona and Thedford are used in making drain tiles. Most of the recorded production (Table 4: Wingham District), however, represents clay used in the manufacture of cement at St. Marys.

Industrial mineral development in the Owen Sound area is currently receiving consideration for grants funded by the Ontario Government's BILD under the Small Rural Development Program.

Peat

Peat is extracted for horticultural purposes in very small quantities from bogs in the region. More recently, enquiries have been made regarding ownership of peatlands in the Owen Sound and Wingham Districts.

Salt

Ontario's 1981 production comes from two underground mines and four brine well operations in the Salina Formation of the Southwestern Region. The total salt production in 1980 was about 5 million tonnes valued at more than 72 million dollars. The two underground mines produced approximately 4 million tonnes of rock salt which is mainly used in the de-icing of streets, highways and so on, and in the chemical industry for the manufacture of caustic soda and chlorine. The Canadian Salt Company Limited's Ojibway Mine near Windsor obtains rock salt from the Salina Formation E unit at a depth of approximately 305 m below the surface; production in 1981 is equivalent to that in 1980. The salt mine operated by the Sifto Salt Division of Domtar Incorporated at Goderich obtains rock salt from the Salina Formation A-2 unit at a depth of about 537 m below the surface; production in 1981 is below the level of 1980.

The four brine well operations produce salt for use in the chemical industry for the manufacture of soda ash, calcium chloride, caustic soda and chlorine, and as sodium chloride in specific industries (food-grade salt and so on). The salt is recovered from either the Salina Formation B, E, or F units. Allied Chemical Canada Limited obtains salt brine from wells in the vicinity of its Amherstburg plant for manufacture of soda ash and calcium chloride by the Solvay process. Dow Chemical of Canada Limited recovers salt brine from wells in the vicinity of its Sarnia plant for the manufacture of caustic soda and chlorine. The Canadian Salt Company Limited produces food-grade salt from its brining operation near Windsor; production in 1981 is at the same level as in 1980. Sifto Salt Division of Domtar Incorporated also produces food-grade salt from its brining operation at Goderich.

Theses Projects

Several students enrolled at Ontario Universities have completed geoscience projects applicable to the Southwestern Region during 1981.

B.Sc. Research

1. Ariss, M.—University of Western Ontario, 1981. Study of the Bass Islands Formation, Bois Blanc Formation, and Intervening Erosional Unconformity.
2. Bloemendal, J.W.—University of Western Ontario, 1981. The Cabot Head/Grimsby Formational Contact of Southern Ontario.
3. Fera, V.C.—University of Western Ontario, 1981. Geology of the Seckerton-Seckerton North Reef, Lambton County, Ontario.

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4. Morand, M.A.—University of Western Ontario, 1981. Geology of the Upper Facies of the Middle Devonian Lucas Formation, Beachville, Ontario.

5. Moses, R.J.—University of Waterloo, 1981. The Occurrence of Helium in Southern Ontario Natural Gases.

6. Opekar, C.P.—University of Western Ontario, 1981. The Geology of the Dawn 156 Pool: A Guelph Pinnacle Reef.

7. Rahme, G.—University of Western Ontario, 1981. Geology of the Atlas Gas Field, Essex County (Offshore) Ontario.

8. Riediger, C.L.—University of Waterloo, 1981. Evaluation of the Oil Shale Potential of the Collingwood Shale.

M.Sc. Research

Scott, A.—University of Waterloo, 1981. An Examination of the Effects of Weathering on Engineering Design in Southern Ontario Shales.

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Introduction

Current staff in the Thunder Bay Office includes: K. G. Fenwick, Regional Mineral Resources Coordinator; W. H. McIlwaine, Resident Geologist; J. F. Scott, Resource Geologist; and A. R. Dowton, Secretary. Contract staff comprised the following: F. J. Kristiansson, Geologist, assigned to District Land Use Plans and queries regarding aggregate resources; the Beardmore-Geraldton Economic Geologist Program was supervised by J. K. Mason, Resource Geologist, with assistance from C. D. McConnell, Resource Geologist; B. R. Schnieders, Resource Geologist continued his work on the Atikokan Economic Geologist Program; A. A. Speed, Resource Geologist, was responsible for a limestone study which has been completed; H. Brown, J. Jackson, and H. M.

Bourdages were all on contract at different times to work on gold compilations; W. D. Love was preparing Data Series Maps for the Beardmore-Geraldton area; N. Evans worked as a summer assistant; A. Erdic and C. Vecchione were employed as Experience '81 students. A. Erdic also worked on a part-time basis during the latter part of the year.

Resident Geologist's Activities

Much of the year was spent in consultation with prospectors and geologists from exploration and mining companies, and in the field visiting mineral occurrences and Ontario Geological Survey field parties. Office staff were engaged in; conducting tours for schools and other

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Tully Twp.	42A/14SE	Gold Shield Syndicate	BM, Au	Assess.	DD-4-1914 ft.	1980	2.2872	T-1915
	42A	NorcenEnergy Resources Ltd.	BM	"	Mag,HLEM, AMag AEM, DD-1-149m	1980	2.3030, 2.3305, 2.3391, 2.3355	T-1966
	42A/14SE	Abitibi Price Inc.	BM	"	DD-3-2284 ft.	1981	-	T-2344
Turnbull Twp.	42/12E	Canadian Gold & Metals Inc.	Au	"	AEM, AMag	1980	2.3752	T-2366
	42A/5NE	J. Larche Property	-	"	rTr,mech.equip.	1980	-	T-1996
Walls Twp.	42B/13	Amx Minerals Expl. Ltd.	-	"	DD-12-1182 ft.	1980	2.3283	T-1961
	42B/13NW	L.Armstrong Prop.	-	"	rTr, sTr	1981	-	T-2339
West Ridge Lake Area	42J/5NE	Selco Inc.	diamonds	"	DD-2-234m	1980	-	T-2347
West Sunday Lake Area	32L/4	Ingamar Exploration Ltd.	Au	"	VLF, Mag, EM	1981	2.3904	T-2362
	32L	Dome Exploration	Au	"	EM, Mag	1981	2.3867	T-2349
	32L/4, 32E/3	Gold Shield Syndicate	Au	"	DD-12-3835 ft. GL	1981	2.4017	T-1924
Whitesides Twp.	42A/5NW	Smith-Morrison Prop.	-	"	Mag,CEM,PEM	1979	2.3497	T-1913
	42A/5NW	G. Mageau Property	-	"	rTr,manual labor	1980	-	T-1993
	42A/5NW	John Reed Property	-	"	manual labour	1981	-	T-2381
Whitney Twp.	42A/6NE	Rosario Resources Canada Ltd.	Au	"	Mag,VLF,AMag,GL DD-6-2897 ft.	1979, 1980, 1981	2.3401, 2.3544	T-1052 T-2320
	42A/11SE	Texasgulf Can.Ltd.	Au	"	Mag,HLEM	1979, 1980	2.3402	T-2312
	42A/6	Amx Minerals Expl Co. Ltd.	-	"	GL	1980	2.3797- 2.3801	T-1978
	42A/6NE	R.Allerston Prop.	Au	"	IP,DD-3-975 ft.	1979, 1981	2.3613	T-1052
	42A/6NE	Augdome Expl Ltd.	Au	"	Mag	1980	2.3620	T-282
Wilhelmina Twp.	42A/12,13	Gulf Minerals Canada Ltd.	-	"	DD-2-812 ft.	1981	-	T-2367
Yeo Twp.	410/9SE	Cominco Ltd.	Au	"	Mag, HLEM	1979	2.3220, 2.3358	T-1953
	410/9,41P/ 12	Canadian Gold & Metals Inc.	Au	"	Mag, HLEM	1980	2.3559	T-2357

Precious Metals

Gordon Leliever, through a family-owned holding company, Canadian Gold and Metals has carried out a very active exploration program in the Gogama area on properties held by various companies controlled by Leliever. The basic exploration philosophy was to re-examine old showings, cover the area with geophysical surveys and strip the overburden from the anomalies enabling the bedrock to be examined. Since the overburden thickness was generally thin the method proved to be effective. Some diamond drilling and percussion drilling was also done. A much publicized gold deposit was discovered this summer on ground held by Chester Resources in Chester Township. Stripping uncovered an extensive shear zone with reportedly high gold values. Nearby diamond drilling intersected another zone with gold values. A total of 63 holes are planned to evaluate the two zones.

Kidd Creek Mines Limited (formerly Texasgulf) diamond drilled extensively in Hoyle Township beside on the

Hoyle Pond deposit. Approximately 27 000 feet was drilled on various projects. The company also diamond drilled 3000 feet in Ogden Township. A length of 2000 feet of percussion drilling was done in Bristol Township for gold exploration (Kidd Creek Mines Limited, personal communication).

Preussag Canada Limited drilled ten holes on J. Croxall's claims in Bristol Township. Narrow low grade gold intersections were obtained (Preussag, personal communication).

Lacana Mining Corporation Limited trenched and sampled the Triple Lake prospect in McArthur Township. The company also drilled six diamond-drill holes on the old Bay Lakes property in Shaw Township (Lacana, personal communication).

Noranda Explorations Limited drilled four holes (1200 feet) in Sewell Township and three holes (900 feet) in Walker Township (Noranda Explorations Limited, personal communication).

EXPLANATION

- Exploration activity in 1981 (keyed to Table 2)
- Ⓐ Location of OGS field party in 1981
- ▨ Boundary of Resident Geologist's district.
- Map or report issued by the Ontario Geological Survey (keyed to Table 1)
 - P. — Preliminary Map
 - 2434 — Coloured Map
 - GR. — OGS Report
 - OFR — Open File Report
 - NOEGTS — Northern Ontario Engineering Geology Terrain Study

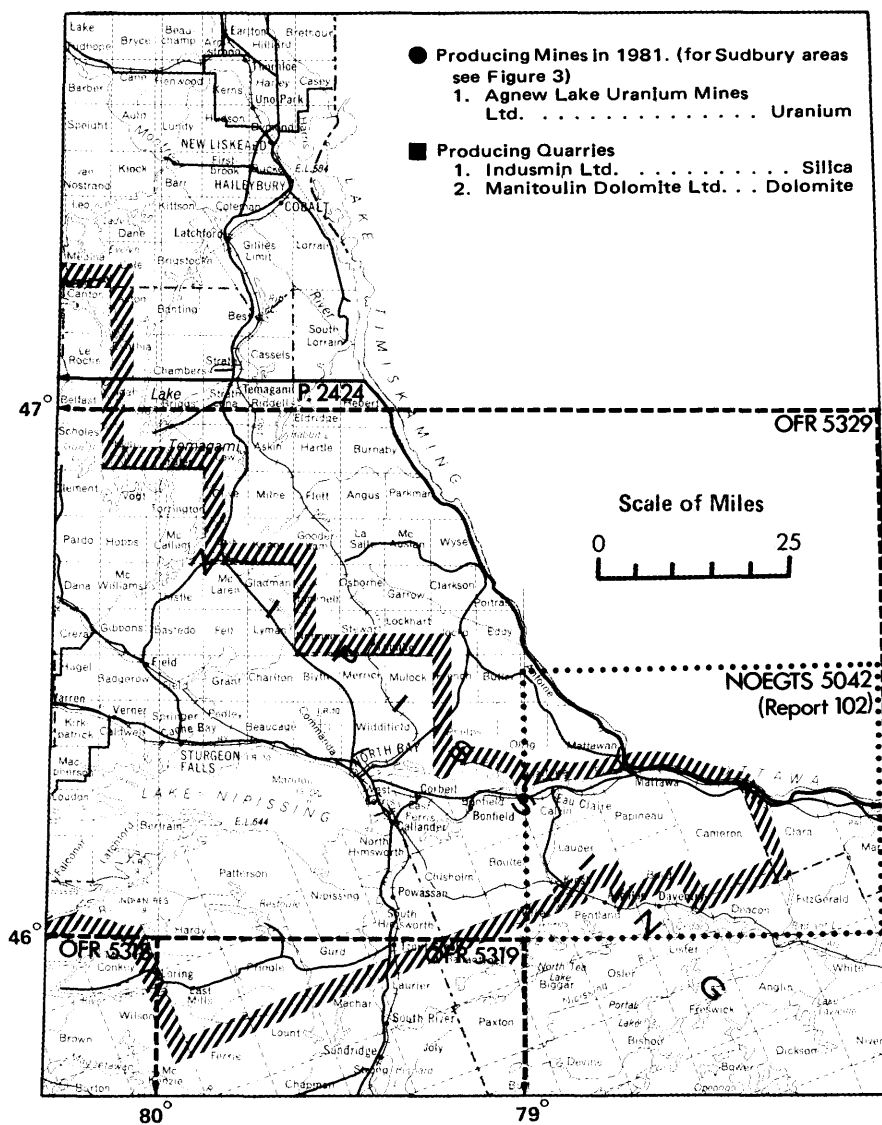


Figure 2
SUDBURY RESIDENT GEOLOGIST'S DISTRICT