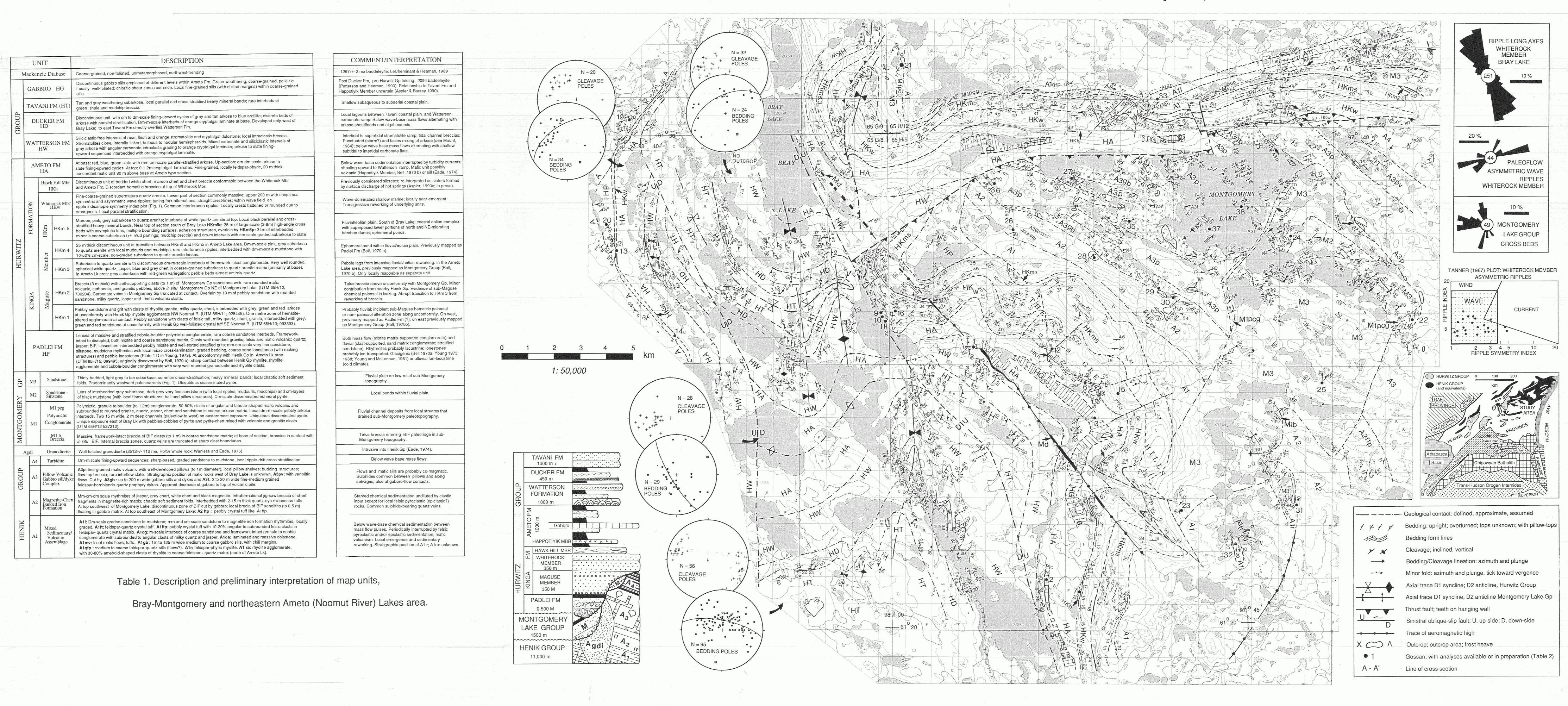
Figure 1. Geological map, Bray-Montgomery Lake area Map units as in Table 1. Stereonets are equal angle, lower hemisphere projections (square denotes pole to cylindrical best-tit great circle).



Contribution to the Canada-Northwest Territories

Economic Development Agreement Minerals Initiative, 1991-1996.

GEOLOGICAL SURVEY OF CANADA OPEN FILE 2428

Geology by L.B. Aspler, T.L. Bursey, A.N. LeCheminant, 1991 Compiled and interpreted by L.B.Aspler, 1991

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	COSCAN	CAMOUN		ELEMENT METHOD DETECTION LIMIT	Au NA 5 ppb	Co DCP 1 ppm	Ni DCP 1 ppm	Cu DCP 0.5 ppm	Zn DCP 0.5 ppm	As NA 2 ppm	Mo DCP 1 ppm	Ag DCP 0.5 ppm	Cd DCP 1 ppm	Sb NA 0.5 ppm	W NA 2 ppm	Pb DCP 2 ppm
	GOSSAN	SAMPLE	UTM	LITHOLOGY												
	1	91-9-25A	65H/5; 565107	Disseminated sulphides		8	5	22.9	23.5	7	5	.9	2	.7	2	<2
	40004	91-9-25B		in Hurwitz gabbro and	111	17	15	37.9	20.5	8	5	<.5	<1	1.1	<2	<2
	1	91-9-25C		Ameto Formation near	6	66	39	151	44.4	28	4	<.5	2	1.4	2	<2
	1	91-9-25D	13	Mackenzie db contact	<5	12	27	26.1	31.6	17	3	<.5	<1	1.1	<2	<2
	2	91-20-36	65H/5; 595015	Sulphides in quartz	<5	20	27	289	9.7	5	11	<.5	<1	1.9	<2	<2
	3 1	91-16-3	65H/5; 611080	veins cutting Hurwitz	<5	3	10	15.4	4.9	<2	12	1.5	<1	<.5	<2	4
	4	91-54-20C	65H/11;038426	gabbro	Orthopped							2.0	\1	\. .5	~2	7
	5	91-6-3A	65G/8; 505196	Oxides in concordant	and the same of th											
	. 6	91-15-34	65H/5; 606095	layered chert and chert	TRA ESPOCIA											
	7	91-28-71	65H/5; 605015	breccia; Hawk Hill	The state of the s											
	8	91-54-30	65H/11;036425	Member	NAME OF THE PERSON OF THE PERS											
	9	91-13-6	65G/8; 530119		<5	2	6	5.6	5.0	3	14	<.5	<1	8.9	13	<2
	10	91-25-1	65G/8; 531118	19 Ave -	<5	2 .	2	3.0	2.8	5	9	<.5	<1	3.1	8	12
	10	91-25-2	,#	Oxides in discordant	<5	1	3	3.6	3.3	12	. 9	<.5	<1	7.4	15	<2
	10	91-25-3	Ħ,	chert breccia; Hawk	<5	2	6	106	5.3	10	8	<.5	<1	8.6	51	<2
	11	91-1-1	65G/8; 534117	Hill Member	<5	<1	4	3.1	4.6	2	12	<.5	<1	3.9	30	2
	11	91-1-2	111	Tankana Para Para Para Para Para Para Para P	<5	2	7	4.6	7.1	5	15	<.5	<1	44.0	59	2
	11	91-1-3	11		<5	2	7	3.8	5.0	11	15	<.5	<1	13.0	77	$\frac{2}{2}$
	12	91-7-20	65H/5; 595106		6	16	- 5	3.1	4.8	<2	10	<.5	<1	1.7	3	_<2
	13	91-19-9	65G/8; 431144	Sulphides/oxides in	<5	1	3	2.1	1.9	<2	8	<.5	<1	.5	<2	<2
	14	91-23-3B	65G/8; 453111	quartz arenites;	<5	<1	3	3.2	1.3	<2	13	<.5	<1	<.5	2	<2
	15	91-15-22	65H/5; 619089	Whiterock Member	<5	10	9	3.5	2.6	<2	8	<.5	<1	<.5	<2	<2
	16	91-12-1	65H/5; 536121		<5	2	5	2.6	4.2	10	8	<.5	<1	4.7	67	<2
	17	MS3-1	65H/10;065387	Maguse Mbr qtz-pebble		··········	-				- 0		<u> </u>	7./	07	<u> </u>
j.,	18	MS3-2	65H/10;066388	conglomerate, with py												
	19	91-29-10	65G/9; 435193	Sulphides in Padlei Fm	190	4	6	14.2	8.8	11	9	<.5	<1	1.5	<2	<2
	20	91-19-15	65G/8; 426151	mixtite conglomerate	14	12	24	78.0	27.1	2 -	7	<.5	<1	1.0	<2	
	21	91-26-14A	65H/12;537212	Pebble-cobble, py-qtz	480	: 59	72	69.7	30.8	54	5	<.5	<1	4.3		<2
	21	91-26-14B	ti	clasts in Montgomery	120	56	50	135	12.8	760	7	.8			<2	10
	21	91-26-14C	11	Lake Gp conglomerate	1600	120	140	151	14.7	120	9	.8	<1 <1	3.4 7.0	<2	12
	22	91-39-18C	65H/5; 727116	Disseminated			210	131	17./	120	7	.0	<1	7.0	<2	28
	23	91-28-40	65H/5; 606005	sulphides; Montgomery	6	5	8	7.5	9.7	.13	. 9		. 4	ے .	•	•
	24	91-32-6A	65H/5; 683150	Lake Gp sandstone and		~	0	1.3	7.1	.13	11. 9 11.00	<.5	<1	<.5	2	<2
	25	91-50-4	65H/5; 697096	conglomerate												
_	26	91-44-42	65H/5; 580150		<5	2	2	13.9	20.6	15	. 1	سع ر	. 4		^	
	27	91-44-15	65H/5; 602169		7	4	. 7	13.9	20.5	15	<1	<.5	<1	<.5	2	<2
	28	91-47-9	65H/5; 611141	Disseminated pyrite in	31	4	10	89.8	8.0	3	<1	<.5	<1	<.5	<2	2
	29	91-47-28A	65H/5; 634129	quartz veins; Henik	<5	6	8	26.7	10.3	<2 10	3	<.5	<1	.5	<2	<2
	29	91-47-28B	34	Group BIF (unit A2)	310	87	96	61.8	10.3	46	<1	<.5	<1	1.5	<2	<2
	30	91-42-9	65H/5; 640127		170	122	136	783	64.1	46 7	6	1.6	<1	6.8	<2	32
	31	91-52-16A	65H/5; 686049	жение по		122	-130	103	. 04.1	1	3	<.5	<1	1.5	<2	4
	32	91-52-2	65H/5; 664033	Py in qtz veins; A1 IF									···			
	33	91-38-5	65H/12;635190	mudstone-mag. A1 IF	<5	9	10	4.6.1	20.5		4		-	······································		
agains 🗪	34	91-60-25		Cpy-py qtz vein Henik	1600	Commence	19	46.1		9 -	1	<.5	<1	3.4	<2	<2
				Gp rhyolite agglomerate	TOOL	139	499	1280	3.2	3 +	<1	2.3	<1	<.5	<2	<2
<	35	91-LAA-T37	65H/5; 624155	Sulphides at volcanic/	00	70		0.1-	0.6			-				
	36	91-44-33	65H/5; 572169	gabbro contacts	80	73	74	217	94.7	17	6	3.5	<1	9.7~	<2	64
		91-LAA-T42			11	51	183	40.2	96.4	10	3	<.5	<1	<.5	<2	<2
	37	91-41-14	" " UJ4131	Sulphides along pillow	28 ·	97	51	1390	17.2	5	4	.9	1	1.1	<2	<2
		91-LAA-T45	65H/5; 666161	selvages and inter- pillow zones	<5	20	13	708	23.8	36	3	1.0	<1	1.0	<2	<2
			~~~~, 000101 §	hunda Tolles	34	34	46	6540	67.5	3	3	3.9	<1	.8	33.	<2

Table 2. Geochemistry of grab samples. Gossan numbers are plotted on Figures 1 and 2. Geochemistry of gossans with no reported values is in progress. All analyses by X-Ray Assay Laboratories, Don Mills, Ontario.

Figure 3 A) Downplunge pro	ojection.
View to the southwe	est from NE of Montgomery Lake to SW of The Grey Hills.
The gap on the sout	theast results from structures close to the projection plane.
Figure 3 B) Cross section,	Montgomery Lake area (see Fig. 1 for section line).

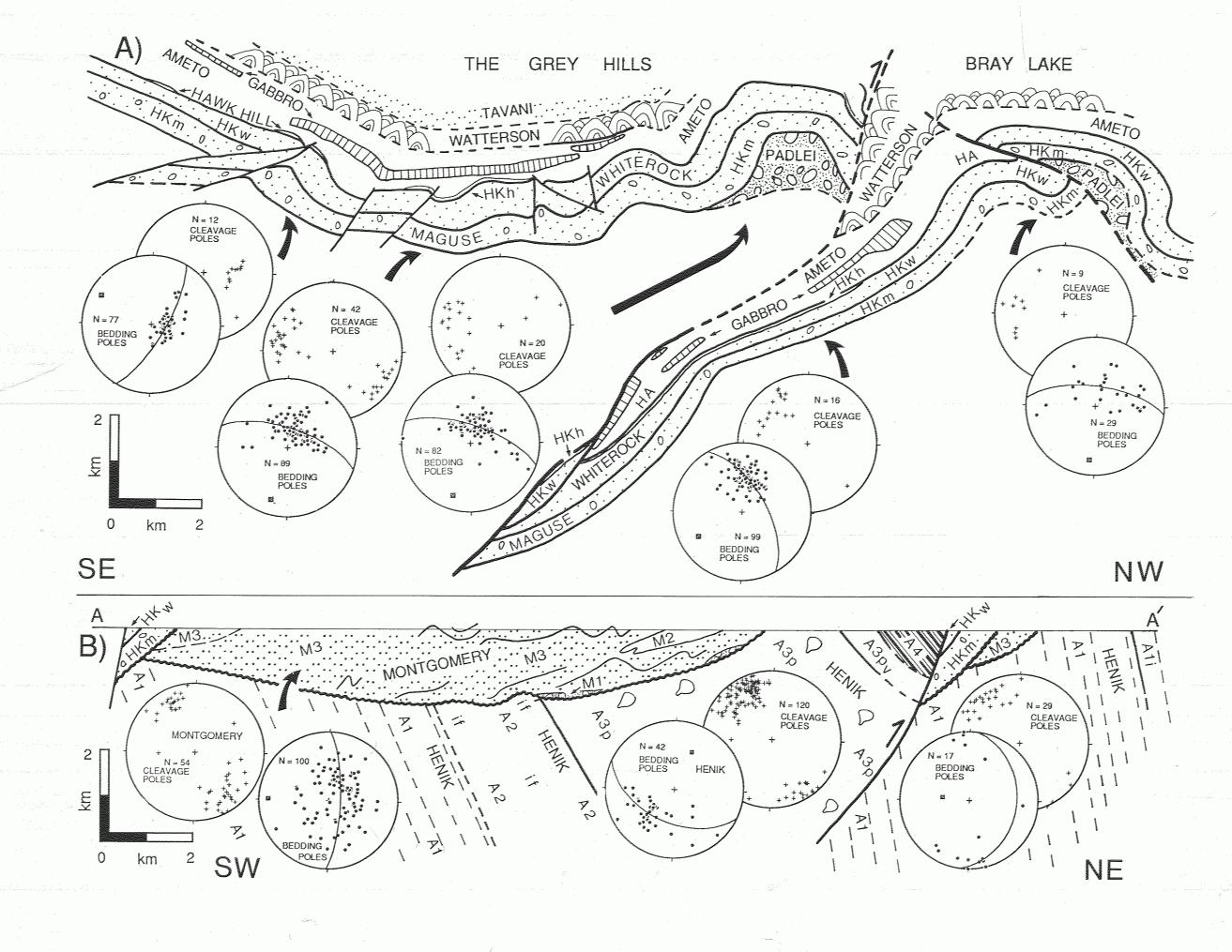
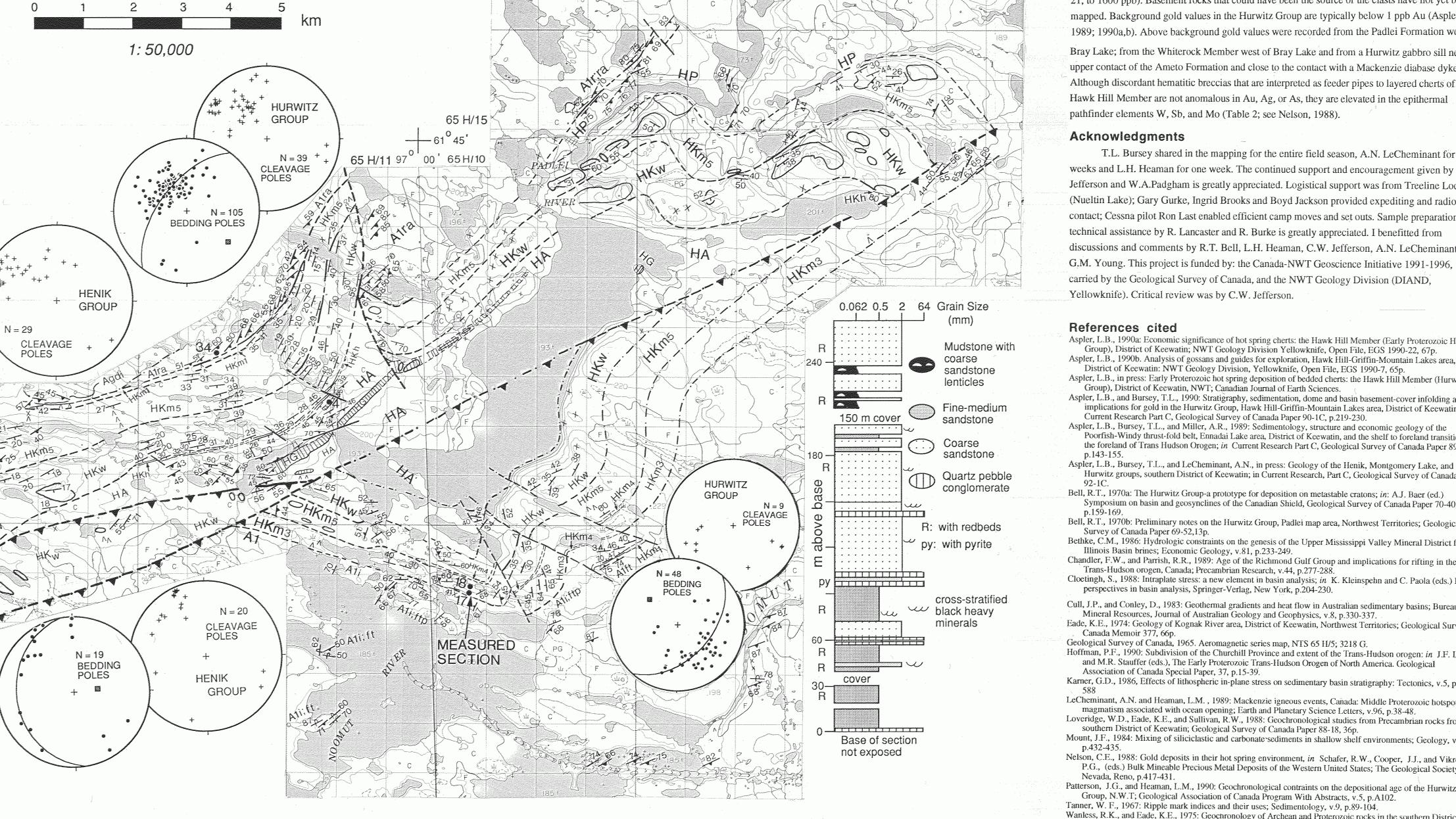


Figure 2. Geological map, northeastern Ameto Lake (Noomut River) Legend and map units as in Figure 1 and Table 1. Measured section is through rocks previously considered Montgomery Lake Group and Padlei Formation that are reassigned to the Maguse Member.



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#### MARGINAL NOTES

Presented herein are the preliminary maps from work carried out during the first field season of a Canada-NWT Minerals Initiative project (Figs. 1, 2; Aspler et al., in press). Three angular unconformity-bounded supracrustal packages are exposed in the Bray-Montgomery-Ameto Lakes area (Table 1): the Henik Group (Archean), the Montgomery Lake Group (age uncertain) and the Hurwitz Group (Early Proterozoic).

### Stratigraphy and Sedimentation

The Henik Group (Eade, 1974) consists of: 1) unit A1, a mixed sedimentary-felsic volcanic assemblage cut by gabbro sills and dykes (with magnetite iron formation-bearing sandstone to mudstone turbidites, and local quartz-rich sandstones and intraformational conglomerates); 2) unit A2, magnetite-chert banded iron formation (interbedded with felsic tuffs, but uncontaminated by other siliciclastic rocks); 3) unit A3, a mafic volcanic/gabbro sill-dyke complex (with local late feldspar-quartz sills and dykes) and 4) unit A4, a graded sandstone to mudstone turbidite sequence (apparently devoid of volcanic rocks and gabbroic intrusions). At Montgomery Lake, the Henik Group forms a NE-dipping homocline, with a minimum thickness of 11 km. Evidence for thrust repetition is lacking, and metamorphism is at or below biotite grade. The base of the Henik Group is not exposed in the map area; it is not known if units A1 to A4 were deposited directly on older gneissic basement (e.g. Loveridge et al., 1988) or if they represent parts of a thicker volcano-

The principal exposures of the Montgomery Lake Group (Eade, 1974) are in a NE-trending

outlier, eastern Montgomery Lake, and in a discontinuous belt to the north (Fig. 1). An angular unconformity at the base of the group is inferred because: 1) Henik Group stratigraphy is continuous on either side of the outlier but is truncated at both northwest and southeast contacts, where moderately NE- dipping Henik Group is overlain by gently south and west-dipping Montgomery Lake Group; and 2) the ENE-trending Henik Group stratigraphy north of Montgomery Lake is truncated by the east-trending belt of Montgomery Lake Group rocks. Clasts in basal Montgomery Lake Group reflect adjacent basement rock types. Cross beds from the entire Montgomery Lake Group indicate west, SSW, and NNW paleoflow (Fig. 1). A tentative depositional model is that of a low-relief sub-Montgomery paleotopography with local fluvial channels (implied by the limited thickness and distribution of basal conglomerate) that drained westward across a fluvial plain (M3 sandstone) with local paleoridges (M1b breccia) and ponds (M2 sandstone/ siltstone). An angular unconformity separates the Montgomery Lake Group from the Hurwitz Group in the Montgomery type area. In the the Noomut River area, rocks previously mapped as "Montgomery Lake Group" (Bell, 1970b) are reassigned to basal Hurwitz Group (Maguse Member) and are conformable with the remainder of the Hurwitz Group section (Fig. 2; Aspler et al., in press).

collisional events in Trans-Hudson Orogen. Mechanisms for basin subsidence and intrabasin arching are uncertain, but may reflect intraplate stress arising from eastward subduction beneath the northwestern Rae Province during convergence of the Chinchaga and Buffalo Head terranes (see Hoffman, 1990), or from extensional processes related to the opening of the Manikewan Ocean (see Chandler and Parrish, 1989). Accordingly, basin initiation was by regional subsidence of a moderate relief topography, preserving Padlei Formation valley fills, rather than by rifting. Broadening of the basin by continued subsidence is recorded by progressive onlap of lower Hurwitz Group units in a terrestrial to marine transition (Padlei Formation to Whiterock Member). The progressive increase in textural and compositional maturity upsection denotes transgressive reworking. Symmetric thickness variation (Bell, 1970a; Aspler, 1990a; in press) and absence of rocks that could represent a shelf-slope-rise sequence argue against a passive margin setting. Although most modern geothermal areas form near active plate boundaries and are associated with magmatic processes, scope exists for the generation of hot spring deposits (Hawk Hill Member) in

The Hurwitz Group represents sedimentation in an intracratonic basin unrelated to

intracratonic basins without concurrent magmatism (e.g. Cull and Conley, 1983; Bethke, 1986). The end of sinter deposition and the abrupt appearance of immature siliciclastic debris are attributed to drowning of the Kinga shelf concurrent with uplift along a NE-trending arch between Bate and Griffin Lakes (Aspler, 1990; in press). The basin narrowed and deepened in an offlap sequence prograding away from the arch. Accordingly, Ameto Formation pelites represent a distal ramp, Watterson Formation carbonates indicate an inner ramp, lenses of Ducker Formation semipelite (+/- carbonate) suggest lagoons, and Tavani Formation immature siliciclastic rocks signify a coastal sand plain. The interpreted coincidence of basin narrowing with basin deepening denotes tectonic rather than eustatic control. Similar relationships elsewhere have been attributed to effects of intraplate stress in intracratonic and passive margin basins (Karner, 1986; Cloetingh, 1988). Structural Geology

The principal structural elements that affect the Hurwitz Group are: 1) a NE and E-trending, north-vergent thrust north of Montgomery Lake, that juxtaposes Henik Group and lower Hurwitz Group above upper Hurwitz Group 2) the gently SW-plunging Grey Hills synclinorium in the hanging wall of the thrust, with minor folds and oblique-slip faults distributed in a box-like array; 3) a gently SW-plunging anticlinorium in the footwall of the thrust, with a south-vergent back-

thrust; and 4) two NW-trending oblique-slip faults that bound a block of upper Hurwitz Group strata west of Bray Lake, in which a Type II interference pattern has resulted from cleavagebearing north and NE-trending folds refolding earlier folds that lack an associated cleavage (Figs. 1; 3 A). The Hurwitz Group was deformed before ca. 1750 Ma, the age of the Nueltin Granite (U/Pb, Loveridge et al., 1988; cf. Rb/Sr, Wanless and Eade, 1975); how long before is unknown. In the Montgomery Lake Group, a variably penetrative, NE-trending cleavage, associated with open folds, is concordant with cleavage in the Hurwitz Group (Figs. 1, 3 B). Older NW-trending folds lack a related cleavage and are cut by the NE-trending cleavage. Axial surfaces of the NWtrending folds are concordant with bedding trends in subjacent Henik Group. Archean rocks in the hanging wall of the E-trending Proterozoic thrust define a moderately to steeply NE-dipping homocline (Figs. 1; 3 B). NW-trending folds and cleavage are rare; NE-trending cleavage is predominant and appears to intensify toward the Proterozoic thrust. The homocline appears to follow the outline of the Grey Hills synclinorium south of the map area (Eade, 1974; Geological Survey of Canada, 1965). In the footwall of the thrust, Archean rocks are folded about NEtrending axial surfaces and are steeply (50-900) plunging.

The principal structure north of Ameto Lake is a NE-trending, NW-vergent imbricated thrust (Fig. 2). In the footwall, the Hurwitz Group and basement are folded in a Type I interference relationship defined by folds with steeply dipping NW-trending and NE-trending axial surfaces. The NW-trending folds lack an associated cleavage. In the hanging wall, the Hurwitz Group and the basement-cover contact are folded in a NW-plunging syncline and cut by NWtrending cross faults. However, cleavage trends are predominantly northeast. Archean rocks in the footwall are folded about a NE-trending cleavage; the folds are steeply plunging (>70°; commonly downward-facing). Although Archean rocks are deformed together with the Hurwitz Group, an earlier strain history is indicated by the contrast in plunge and orientation of folds in the two units, by the presence of foliated Archean clasts in basal Hurwitz Group and by a contrast in apparent

Mineral occurrences mapped and sampled are plotted on Figures 1 and 2; UTM locations

and available analytical results are given in Table 2. Gossans in the Henik Group are abundant and

#### strain at the Henik Group-Hurwitz Group unconformity. **Economic Geology**

include: 1) chalcopyrite/pyrite-bearing quartz veins cutting rhyolite agglomerates northwest of Noomut River; 2) pyrite- bearing quartz veins cutting banded iron formation west of Montgomer Lake; 3) sulphide disseminations along pillow selvages and inter-pillow zones, Montgomery Lake and 4) pyrite-bearing quartz veins at pillow volcanic-gabbro contacts, Montgomery Lake. Gossans from disseminated pyrite are ubiquitous in the Montgomery Lake Group. East of Bray Lake, basal polymictic conglomerates contain gold-bearing pebble to cobble-sized pyritic chert clasts (Gossan 21; to 1600 ppb). Basement rocks that could have been the source of the clasts have not yet been mapped. Background gold values in the Hurwitz Group are typically below 1 ppb Au (Aspler, 1989; 1990a,b). Above background gold values were recorded from the Padlei Formation west of Bray Lake; from the Whiterock Member west of Bray Lake and from a Hurwitz gabbro sill near the upper contact of the Ameto Formation and close to the contact with a Mackenzie diabase dyke. Although discordant hematitic breccias that are interpreted as feeder pipes to layered cherts of the

#### pathfinder elements W, Sb, and Mo (Table 2; see Nelson, 1988). Acknowledgments

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