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GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA

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DESCRIPTIVE NOTES

The Hornby Bay and Dismal Lakes groups are two sequences of Early to Middle Proterozoic shallow water epicontinental sedimentary rocks that constitute the lower part of Amundsen Basin (Coppermine Homocline). Reconnaissance mapping by Geological Survey of Canada helicopter parties resulted in initial lithological subdivision and publication of the 1:250 000 scale Coppermine and Dismal Lakes map sheets (Baragar and Donaldson, 1973). In 1978, under the support of the Department of Indian Affairs and Northern Development in Yellowknife, a comprehensive program of systematic regional mapping of the region was initiated by G.M. Ross, C. Kerans and J.A. Donaldson (Carleton University, Ottawa) and completed in 1982. The area mapped is outlined in Figures 1 and 2. Most of the geology was mapped by ground traverses and subsequent air photo interpretation at a scale of 1:100 000 and locally 1:50 000 and 1:5000. A number of mining companies involved in uranium exploration provided helicopter support and access to drill-core information. A preliminary summary of the regional depositional history was published by Kerans et al. (1981) and detailed lithological descriptions and syntheses can be found in Ph.D. thesis by Ross (1983a, Hornby Bay Group) and Kerans (1982, Dismal Lakes Group).

The Hornby Bay and Dismal Lakes groups unconformably overlie rocks of Wopmay Orogen, an Early Proterozoic collisional mountain belt (Hoffman and St-Onge, 1981; Hoffman and Grotzinger, 1984, and references therein). The tectonic history and development of structures in Wopmay Orogen also affected the development of depositional systems in both the Hornby Bay and Dismal Lakes groups. Wopmay Orogen is cut by an array of northeast- and northwest-trending conjugate transcurrent faults that formed during the terminal phase of shortening (Hoffman, 1980). Dip-slip reactivation of major transcurrent faults (Sinister Fault, Fault River-Harrison River fault system, Tesnhenji Fault; Fig. 2) occurred sporadically throughout and after deposition of the two groups. Although the general style of movement on the faults was dip-slip, most faults have "null points" along their length (Eisbacher, 1981) where the sense of movement reversed (i.e. from northwest-side down to southeast-side down) reflecting a change in dip direction of the fault planes, a feature acquired during strike-slip movement (Wilcox et al., 1973).

The Leith Line is a major north-south-trending syndepositional hinge zone (Fig. 2) that apparently became active during deposition of the Lady Nye Formation (Hornby Bay Group) and continued to affect basin evolution throughout Dismal Lakes Group deposition (Kerans et al., 1981). Greater relative subsidence occurred west of the line as reflected in thicker sediments that are of deeper water character than those east of the line. The Leith Line coincides with the western edge of the magnetically distinct Great Bear Magmatic Zone (Fig. 2) and is interpreted as a basement fault (Ross, 1983a).

In general, the Hornby Bay and Dismal Lakes groups represent two major clastic-to-carbonate cycles in excess of 3 and 1 km, respectively. The contact between the two groups is locally unconformable, a feature that can be related to syndepositional northeast-side down movement on the Tesnhenji Fault (Fig. 2). East of the fault, basal Dismal Lakes Group clastics (LeRoux Formation) unconformably overlie clastic rocks of the Hornby Bay Group (Lady Nye and Bigbear formations) and various units of Wopmay Orogen. In the vicinity of Tesnhenji Mountain (Fig. 2), flat-lying LeRoux Formation overlies Hornby Bay Group rocks that were folded and locally overturned by movement on the Imperial and Aquitaine faults. Farther west the contact is conformable and represented by a gradual change from inter-bedded shale and sandstone of the Kaertok Formation into clean quartz arenite of the LeRoux Formation.

Sub-Hornby Bay rocks of Wopmay Orogen display a range in the intensity and depth of pedogenic weathering which reflects differences in climate at the time of weathering (and vs. humid) and subsequent burial history and preservation. Thin weathering profiles in basement rocks of map sheet 86N (Dismal Lakes) are due to truncation during fluvial downcutting of weathered basement rather than formation in an arid climate. The deeply weathered profiles preserved in basement rocks of map sheet 86O (Dismal Lakes) are the result of subsidence and rapid burial of a humid climate profile beneath the Fault River Formation.

Paleocurrents and facies patterns in basal Hornby Bay Group rocks (Bigbear Formation) do not reflect the influence of synsedpositional strike-slip or high-angle reverse movement (Hoffman and St-Onge, 1981) along the conjugate faults in Wopmay Orogen. Therefore, the onset of Hornby Bay Group deposition postdates compression in Wopmay Orogen, which terminated after 1840 Ma, the age of the youngest rocks cut by the transcurrent faults (Bowring and Van Schmus, 1984)

The Hornby Bay Group records sedimentation in distinct, diachronous to coeval, intracontinental depositional systems having an aggregate thickness of 3 km. Deposits of the oldest system (Bigbear Formation) record infill of a north-trending, east-southeast-dipping basin by and climate braidplain systems (members Hb1-Hb3) that culminated in formation of a > 400km² desert sand sea (members Hb4-Hb5; Ross, 1983b). Syndepositional dip-slip reactivation of Sinister Fault is manifested by the occurrence of coarse intraformational conglomerates (member Hb6) and a change in paleodrainage from southeast to southwest (member Hb7). Normal fault activity in the Fault River region, inferred to be nearly contemporaneous with Sinister Fault reactivation, led to deposition of the upward coarsening sandstones and conglomerates of the Fault River Formation (members Hf1-Hf3) which record infill of a fault-bounded trough and the formerly extensive southeast-flowing river system. Drainage of uplifted basement north of Fault River by southwest-and northwest-flowing rivers eroded weathered Great Bear rocks and incised valleys up to several hundred metres deep. Fault River and Big Bear formations and local conglomerates (member HL1) were subsequently buried by upward-fining conglomerates and arenites of Lady Nye Formation (members Hl2 and Hl3). The basal conglomerate of the Lady Nye Formation (member Hl2c) contains a distinct assemblage of cobbles and boulders (up to 30 cm across) including clasts of cherty ironstone derived from Coronation Margin sediments more than 100 km to the east (Hoffman et al., 1984). The dominantly arenaceous rocks of the upper Lady Nye Formation (member Hl3) constitute the deposits of a west-facing braidplain that extended at least from Dismal Lakes south to Leith Peninsula (Fig. 2). The Lady Nye braidplain terminated in a north-northwest-facing delta complex developed in a high-energy marine setting (member Hl4). The conformably overlying East Bear Formation is a relatively thin unit of stromatolitic dolostone that records drowning of the Lady Nye system during transgression and formation of a high-energy northwest-facing carbonate ramp (members He1 and He2). "Equilibrium" carbonate sedimentation led to ramp shoaling during deposition of peritidal carbonates (member He3) that were subsequently buried by a clastic wedge (Kaertok Formation) that flowed to the northwest along the Tesnhenji Fault (Fig. 2). Rapid facies change occurs only in map sheet 86N and records the initial pulse of movement along the Tesnhenji Fault and erosion of Hornby Bay Group rocks from the upthrown block. The Kaertok Formation, a sequence of regressive deltaic-marine siliciclastic rocks, was deposited by a fault-controlled fluvial system that flowed to the southwest along the downdropped block of the Tesnhenji Fault. The top of the Kaertok Formation marks the termination of Hornby Bay Group deposition and onset of the Dismal Lakes Group clastic-to-carbonate cycle.

The Narakay Volcanic Complex, a bimodal basalt-rhyolite complex in Dease Arm of Great Bear Lake, consists of mafic pyroclastic rocks and younger felsic pyroclastics, lavas, and hypabyssal porphyries interbedded with the upper three formations of the Hornby Bay Group (Ross, 1982). Rhyolite porphyry and feldspar-phyric dykes in the Kaertok Formation yield U-Pb zircon dates of 1663 ± 8 Ma (Bowring and Ross, 1985) thus dating the termination of Hornby Bay Group deposition. The feldspar-phyric dykes constitute an east-trending swarm that parallels a gravity high that extends eastward from the Narakay Islands for more than 70 km. The gravity high may reflect thinned and/or anomalously dense crust formed during inferred north-south extension prior to formation of the north- and west-facing Dismal Lakes platform. Other manifestations of this extensional episode include the Hottah Terrane (Ross, 1983a) and the onset of major fault reactivation during upper Hornby Bay Group sedimentation and possibly emplacement of gabbro sheets and dykes in eastern Great Bear Lake area (Western Channel Diabase).

Dismal Lakes Group strata, which have been correlated with Elu Basin rocks in the Bathurst Inlet area (Kerans et al., 1981), record the establishment of a broad epicratonic north- and west-sloping marine shelf that rimmed the northwestern Canadian Shield. The lower part of the LeRoux Formation, basal clastic unit of the Dismal Lakes Group, is restricted to regions west of Tesnhenji Fault and was deposited by southwest-flowing low-energy rivers. Regional subsidence and northward tilting allowed onlap and deposition of marginal marine arenites of upper LeRoux Formation and black shale and arenites of Fort Confidence Formation. West of Leith Line high-energy peritidal clastic and carbonate sediments (member Ds1; Dease Lake Formation) rimmed the Fort Confidence delta system. Transgression, coupled with decreased source area relief, led to an eastward zonation from coastal sabkha (member Ds2) to continental sabkha (part of member Ddu) across Leith Line. Protected marine conditions allowed deposition of a thick (> 600 m) carbonate succession (member Ds3) in the Great Bear Lake area. Member Ds3 and equivalent distal units constitute a monotonous succession of acyclic peritidal deposits that attest to extreme low relief and tectonic quiescence. A distinct stromatolite biostrome at the top of the formation occurs throughout the platform and marks abrupt drowning and transition into subtidal shelf sedimentation. The Sulky Formation has a tripartite subdivision that is a spectacular record of the development of a Proterozoic subtidal carbonate platform. Initial drowning of the platform during eustatic sea level rise caused deposition of quiet water platy dololutite with thin shale partings (member Ds1). Differential subsidence during growth of massive stromatolites of member Ds2 led to formation of an eastern buildup and a western subtidal platform. The buildup (September Lakes Member) high consists of giant quiet water conical-domal stromatolites, with up to 15m synoptic relief, overlain by shoal facies psoolitic and fenestral dolostone (member Ds3). Subtidal shelf facies comprise irregularly laminated stromatolites ("curly bedding" structures; Kerans and Donaldson, 1979) and inter-bedded dololutite (Ds2) overlain by peritidal shoaling-upward cycles (Ds3)

The pattern of an eastern platform high and western subtidal platform, with accentuated subsidence west of Leith Line, continued during deposition of Greenhorn Lakes Formation. Basinal facies consist of inter-bedded subtidal biostromes, calcareous shale and subordinate inter-tidal dolarenite. Monotonous peritidal deposition in the platform high (member Dg1) was interrupted by a period of doming which caused formation of a karstic discontformity overlain by siliciclastic sediments. The magnitude of the discontformity is greatest in the region of the Muskox Intrusion, a layered ultramafic-mafic complex, formerly thought to predate the Dismal Lakes Group (Irvine and Baragar, 1972). The locus of doming and karsting, and the recognition of syndepositional normal faults in Dismal Lakes Group cover strata in the roof region of the intrusion (Kerans, 1983) provide stratigraphic evidence that the intrusion was emplaced during upper Dismal Lakes Group sedimentation. Plateau basalts of the Coppermine River Group conformably overlie Greenhorn Lakes Formation dolostone and are thought to be part of the Mackenzie igneous events (Fahrig and Jones, 1969) which include the Muskox Intrusion and Mackenzie diabase dykes, that record east-west extension.

Except for the gently northward tilt of the Coppermine Homocline, the region is remarkably devoid of structural complexities. Local zones of deformation record post-Dismal Lakes Group (and Coppermine River Group) extension that appears to predate Rae Group sedimentation (upper Proterozoic). Dip-slip movement along reactivated Wopmay Orogen transcurrent faults has caused offset that ranges from several hundred metres (Fault River Fault) to more than 1 km (Sinister Fault) and is associated with brecciation, folding and silicification of Hornby Bay and Dismal Lakes Group rock. Similar magnitude dip-slip offsets occurred along north-trending faults (Hare Indian and Canoe Lake faults) presumably during Mackenzie-age east-west extension

The most impressive example of post-depositional deformation occurs in the Bebensee Lake-Takiaatcho River map areas where incompetent member Dd3 (Dease Lake Formation) evaporitic mudstones form a strata-bound zone of deformation that is spatially related to the sinuous East River Fault zone. Shallow plunging isoclinal folds, with upright to recumbent axial planes, and stratiform breccias are typical of the deformed zone which sharply overlies member Dd2 carbonates with conjugate box folds. More than 600m of structurally intact Dismal Lakes Group stratigraphy overlies the deformed zone. Although kinematic control is sparse, the deformed zone is interpreted as a décollement formed during low-angle normal fault detachment and northward translation, regional significance and timing are unknown.

Ross (1983a) has documented a thick (> 4000 m) succession with a comparable record of intracratonic sedimentation that is broadly correlative with other Early Proterozoic intracratonic basins of the western Canadian Shield (Athabasca and Thelon basins). Although the origin of intracratonic basins is not well understood their occurrence on recently assembled (Hudsonian) continental crust may provide a common link. These basins may represent the flexural response of lithosphere to loading during Hudsonian plate collisions and assembly of the Canadian Shield

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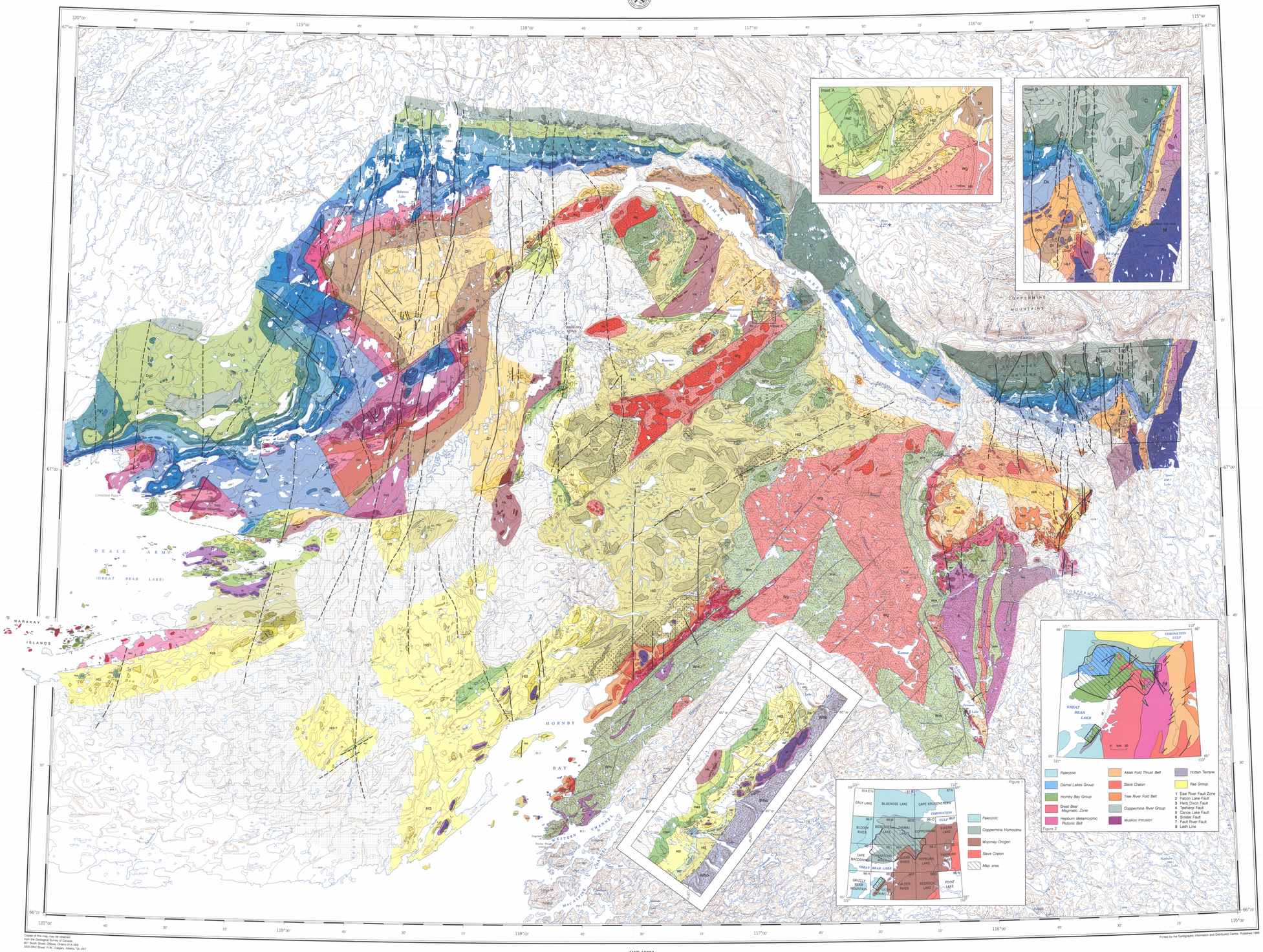

LEGEND

Note: areas of outcrop are shown by dark tint, areas of cover are shown by lighter tint

PALEOZOIC

- P — *Undifferentiated Cambro-Ordovician sedimentary rocks*

MIDDLE PROTEROZOIC (1.6 - 0.9 Ga)

- MACKENZIE (NWR-trending) and other (?) dyke swarms
- COPPERMINE RIVER GROUP
- C — *COPPER CREEK FORMATION: tholeiitic basalt flows*
- MUSKOX INTRUSION
- M — *Gabbro and granophyric roof rocks*
- M' — *Diabase sills with microgranitoid segregations and platy crystals of ilmenite*

MIDDLE AND/OR EARLY PROTEROZOIC

DISMAL LAKES GROUP

GREENHORN LAKES FORMATION (Dgt, Dg1)

- Dgt — *Member g3. East of Leith Line: grey-thin to medium-bedded cherty dolostone with stromatolites, intraclastic breccia, and oolite in upper part; tan dolomitic sandstone and red dolomitic shale with mudcracks, halite hopper casts, and dolomite nodules; evaporite-breccia at base in September Lakes area, disconformity-related karst breccias overlain by beach and peritidal carbonate flats. West of Leith Line: grey-pink thick-bedded dolomitic stromatolite bioherms and biostromes intercalated with tan-red dolomitic shales; upper portion grey-tan thin-to medium-bedded oolitic and intraclastic grainstones and packstones; subtidal shelf to peritidal carbonate flats*
- Dg1 — *Member g1. East of Leith Line: grey medium-bedded dolostone with crystalgal laminites and tepee structures; isolated dolomitic stromatolite biostromes; black to green to red dolomitic shale; tan-grey thin-bedded stromatolitic, oolitic and intraclastic dolostone; shallow shelf and peritidal flats. West of Leith Line: grey-pink thick-bedded dolomitic stromatolite bioherms and flat crystalgal laminites; intraclastic breccia and tepee structures, cyclicity interbedded with grey thick-bedded stromatolite biostromes; open shelf shoaling-upwards cycles Dg1c – undivided*

SULKY FORMATION (Dt1 - Dd3)

- Dd3 — *Member s3. Light grey medium-bedded cherty dolostone with oolite and conical to branched-conical stromatolite biostromes west of Coppermine River; cream-white medium- to thick-bedded dolostone with psoolite, tepee structures and silicified evaporite east of Coppermine River. Shoaling-high energy shelf and peritidal buildup crest*
- Dd2 — *Member s2. Light grey massive stromatolitic dolostone and breccia west of Coppermine River; light grey massive stromatolitic dolostone with conical and domal stromatolites up to 40m in relief; cream-white dolostone breccia and tepee structures east of Coppermine River, deep water carbonate buildup*
- Dd1 — *Member s1. Dark grey thin- to medium-bedded dolostone with intraclastic bed shale west of Coppermine River; red-tan platy dololutite with stromatolites, parallel current lamination and ripple cross-stratification east of Coppermine River, drowned shelf Dku – undivided*
- Dk — *KENDALL RIVER FORMATION: grey thin- to medium-bedded cherty dolostone with stromatolites, oolite and intraclastic breccia; minor intercalated black shale partings in lower portion; top of formation marked by 1-6m thick tan stromatolite biostrome; peritidal flats*

DEASE LAKE FORMATION (Ddu - Dd3)

- Dd3 — *Member d3. Pink medium-bedded mudstone intercalated with cream medium-bedded dololutite; minor chert and skeletal wackestone; strongly bidded megabreccia at Greenhorn and Sulky lakes; mixed carbonate-siliciclastic peritidal flat*
- Dd2 — *Member d2. Red medium-bedded mudstone intercalated with tan medium-bedded dolostone; current lamination, mudcracks and halite hopper casts; sabkha*
- Dd1 — *Member d1. Tan medium-bedded dolomitic sandstone interbedded with oolitic dolostone and stromatolite biostromes; small-scale cross-stratification, mudcracks and intraclastic breccia; high-energy subtidal shelf*
- Ddu — *Member du. Undifferentiated Dease Lake Formation east of Leith Line; tan medium-bedded cherty dolostone intercalated with red medium-bedded mudstone containing halite hopper casts and rare saline beds; red-brown thin-bedded massive arkose; sabkha*
- Df — *FORT CONFIDENCE FORMATION: black and green sandy shale with flaser and lenticular bedding and mudcracks; 2-20m thick lenses of medium-bedded quartz arenite with tabular-planar and trough cross-stratification; mixed marine-deltaic*
- Dl — *LeROUX FORMATION: white-grey medium-bedded quartz arenite with tabular-planar and trough cross-stratification and planar stratification; local conglomeratic litharenite at base (Dlc); mixed fluvial-marine*

WESTERN CHANNEL DIABASE

- W — *Sheets and dykes of gabbro and diabase along the eastern and southern (?) shore of Great Bear Lake; does not intrude units above member He1 of the Hornby Bay Group*

EARLY PROTEROZOIC (2.5 - 1.6 Ga)

HORNBY BAY GROUP

NARAKAY VOLCANIC COMPLEX (Hnb, Hnv)

- Hnv — *Litho-rich wedded to unwedded felsic ash-flow tuff, rhyolite domes and hypabyssal rhyolite porphyries; cauldron (?)*
- Hnb — *Litho-vitric, locally crystal-rich, mafic lapilli tuff, tuff breccia and ash; shallow marine tuff cones*
- Hk — *KAERTOK FORMATION: feldspathic quartz arenite, red and green mudstone and mudchip breccia; in Narakay Islands, composed of calcareous feldspathic arenite, oolitic grainstone and stromatolitic dolostone; deltaic and abandoned lobe embayment*

EAST RIVER FORMATION (Het - He3)

- He3 — *Member e3. Laminated to dismal stromatolitic dolostone, oolitic and intraclastic dolostone and minor red and green mudstone; peritidal carbonate flats; in 86 N, includes chert pebble-granule intraclastic dolarenite at the top of the member; clastic fan*
- He2 — *Member e2. Hummocky cross-stratified calcareous arenite, massive oolitic packstone-wackestone, intraformational conglomerate and silicified digitate stromatolite biohermș; high energy subtidal shelf*
- He1 — *Member e1. Interbedded stromatolitic dolostone, quartzose oolitic grainstone, intraclastic conglomerate, quartz arenite and brown mudstone; high energy tidal flats. Heu – undivided*

LADY NYE FORMATION (Hl1- Hl4)

- Hl4 — *Member l4. Buff to white quartz arenite with green to black, locally evaporitic, mudstone; delta plain to shallow marine*
- Hl3 — *Member l3. Pink, buff to white crossbedded quartz arenite with rare mudstone interbeds and vein quartz pebble lags; braidplain*
- Hl2 — *Member l2*. Micaceous glauconitic arenite; occurs only on Leith Peninsula; parallel lamination, low-angle cross-stratification; marine or lacustrine (?)*
- Hl2 / Hl2c — *Member l2. Purple to buff mottled feldspathic quartz arenite; trough crossbedded; fluvial; member l2c is conglomeratic facies at base of member l2 and is composed of interbedded boulder-cobble conglomerate and pebbly feldspathic arenite; conglomerate contains clasts of quartz arenite (members b5-b8, Bigbear Formation), vein quartz, chert and ironstone; gravel bars in fluvial or paleovalleys*
- Hl1 — *Member l1. Red hematitic feldspathic quartz arenite with vein quartz cobble-boulder beds; fluvial*

FAULT RIVER FORMATION (Hf1- Hf3)

- Hf3 — *Member f3. Buff, nonhematitic coarse grained subfeldsarenite with volcanic-rich pebbly beds (derived from McTavish Supergroup) and large-scale trough and tabular crossbeds; high energy fluvial*
- Hf2 — *Member f2. Friable red hematitic quartz arenite; thin-bedded with volcanic granulestone (derived from McTavish Supergroup) beds near top; ephemeral fluvial*
- Hf1 — *Member f1. Heterolithic, poorly indurated conglomerate and red mudstone at base overlain by indurated heterolithic conglomerate with quartz sand matrix and clasts of Bigbear Formation sandstone (members b6 and b8), alluvial fan and proximal streamflood*

BIGBEAR FORMATION (Hb1 - Hb7)

- Hb7 — *Member b7. Interbedded buff quartz arenite, vein quartz pebbly arenite and rare red mudstone; local dark red hematitic pebbly arenites; fluvial*
- Hb6 — *Member b6. Interbedded intraformational boulder conglomerate and red quartz arenite; local mudstone beds and lithic granulestones in the west; mixed fluvial debris flows/streamfloods and eolian sand flats*
- Hb5 — *Member b5. Red hematitic quartz arenite, interbedded planar beds and large-scale trough crossbeds; rare red mudstone interbeds; eolian sand sea*
- Hb4 — *Member b4. Friable red hematitic quartz arenite; pinches out towards east and west margins of basin; tabular-planar large-scale crossbeds; eolian sand sea*
- Hb3 — *Member b3. Red hematitic crossbedded feldspathic quartz arenite; heterolithic conglomerate beds along the west side of the basin; piedmont fan and braidplain*
- Hb2 — *Member b2. Trough and tabular-planar crossbedded purple hematitic feldspathic arenite/wacke, pebbly sandstone and heterolithic conglomerate; restricted to paleovalleys; braided stream*
- Hb1 — *Member b1. Monolithologic breccias and conglomerates, local micaceous litharenites; silicified feldspathic arenite (silcrete); talus fans and ponded paleovalley fill*

WOPMAY OROGEN

GREAT BEAR MAGMATIC ZONE (Wm, Wg)

- Wg — *Granitic plutons*
- Wm — *McTavish Supergroup felsic volcanic rocks and sediments*

HEPBURN INTRUSIVE SUITE

- Wh — *Biotite- and garnet-bearing granodiorite*

AKAITCHO GROUP

- We — *Metasedimentary and metavolcanic rocks*

HOTTAH TERRANE

- Whc — *Plutonic and metasedimentary rocks*

ARCHEAN (> 2.5 Ga)

SLAVE CRATON

- A — *Foliated Archean granitoid rocks in Wopmay Orogen hinterland*

Glacial cover
Rock outcrop
Frost-heaved outcrop or felsenmeer
Geological boundary (observed, inferred)
Bedding, tops known (horizontal, inclined, overturned)
Minor fold, synform, antiform (arrow indicates plunge)
Multiple fold (arrow indicates plunge)
Fault (solid line indicates downthrow side; observed, inferred)
Fault (sense of displacement unknown; observed, inferred)
Antiform, synform (defined, approximate, arrow indicates plunge)

Copies of this map may be obtained from the Geological Survey of Canada 601 Booth Street, Ottawa, Ontario, K1A 0E8 3303-33rd Street, N.W., Calgary, Alberta T2L 2A7

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INDEX MAP

Geology by J.A. Donaldson and W.R.A. Baragar 1969-1971; G.M. Ross and C. Kerans 1978-1980, G.M. Ross 1981, 1982, Trigg-Woollett, Consultants 1978

Geological compilation and notes by G.M. Ross and C. Kerans, 1984

Geological cartography by J.D. Nairnway, Geological Survey of Canada

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

MAP 1663A

GEOLOGY

HORNBY BAY AND DISMAL LAKES GROUPS, COPPERMINE HOMOCLINE

DISTRICT OF MACKENZIE

NORTHWEST TERRITORIES

Scale 1:250 000 - Échelle 1:250 000

Kilometres 0 2 5 10 15 20 Kilomètres

Universal Transverse Mercator Projection
Projection transverse universelle de Mercator

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Base map assembled by the Geological Survey of Canada from maps published at the same scale by the Surveys and Mapping Branch in 1961, 1965, 1977, 1979, 1984

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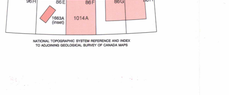
Mean magnetic declination 1989, 35°50' East, decreasing 22.1' annually. Readings vary from 37°48'E in the NW corner to 33°31'E in the SE corner of the map area

Elevations in feet above mean sea level

Geographical names subject to revision



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