



Base from U.S. Geological Survey, 1965  
Universal Transverse Mercator projection  
Generated bedrock geologic map compiled by Warren J. Nokleberg from mapping by Warren J. Nokleberg,  
Ian M. Lange, John W. Ashcraft, Henry T. Mysak, and Richard E. Zetter, 1979-86

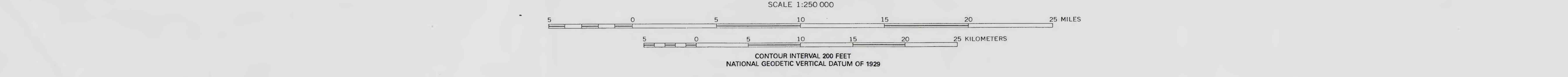


Table 1.—Potential and recognition criteria for gold placer deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

Potential	Recognition criteria present in each area
Moderate	1 + gold 0
Moderate	2 + 0 +
Moderate	3 + gold, cin 1
Moderate	4 + gold, cin 0
Low	6 0 gold, cin 0
Low	7 0 gold, cin 0
Moderate	9 + gold, cin 0
Moderate	11 + gold 0

Table 2.—Potential and recognition criteria for platinum placer deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

Potential	Recognition criteria present in each area
Very low	5 1 0
Very low	8 0 0
Very low	10 0 0

Table 3.—Potential and recognition criteria for gabbroic Ni-Cu deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

Potential	Recognition criteria present in each area
Moderate	A + + Cu, Ni, Co Cu, Ni, Co Cu, Ni, Co +
Low	B 0 0 Ni, Co Cu, Ni 0 +
Low	C 0 0 0 Cu, Ni 0 +
Moderate	D + + Cu, Ni, Co Cu, Co +
Low	E 0 0 0 Cu Cu +

Table 4.—Potential and recognition criteria for podiform chromite deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

Potential	Recognition criteria present in each area
Moderate	A + + Cr, Ni, Co Cr, Ni Cr, Ni, Co +
Moderate	B + + Cr, Ni, Co Cr, Ni Cr, Ni +
Moderate	C + 0 Cr, Ni, Co Cr, Ni Ni +
Moderate	D + + Cr, Ni, Co Cr, Ni Co +
Low	F 0 + 0 0 Co +
Low	G 0 + 0 0 Cr, Ni Ni, Co +
Moderate	H + + 0 Cr, Ni, Co Ni Ni, Co +

Description of recognition criteria  
1. Geologically favorable environment consisting of stream gravels or conglomerates in a region containing gold-bearing host deposits.  
2. Known sites, deposit, prospect, or occurrence.  
3. Occurrence of gold and diamonds in heavy-mineral-concentrate samples.  
4. Anomalous values of Au in heavy-mineral-concentrate samples.

Description of recognition criteria  
1. Geologically favorable environment consisting of stream gravels or conglomerates in a region containing cumulate mafic or ultramafic rocks, or massive peridotites.  
2. Known deposit, prospect, or occurrence.

Description of recognition criteria  
1. Geologically favorable environment of cumulate mafic or ultramafic rock and gabbro or norite dikes and sills intruding or associated with anastomosing belts.  
2. Known deposit, prospect, or occurrence.

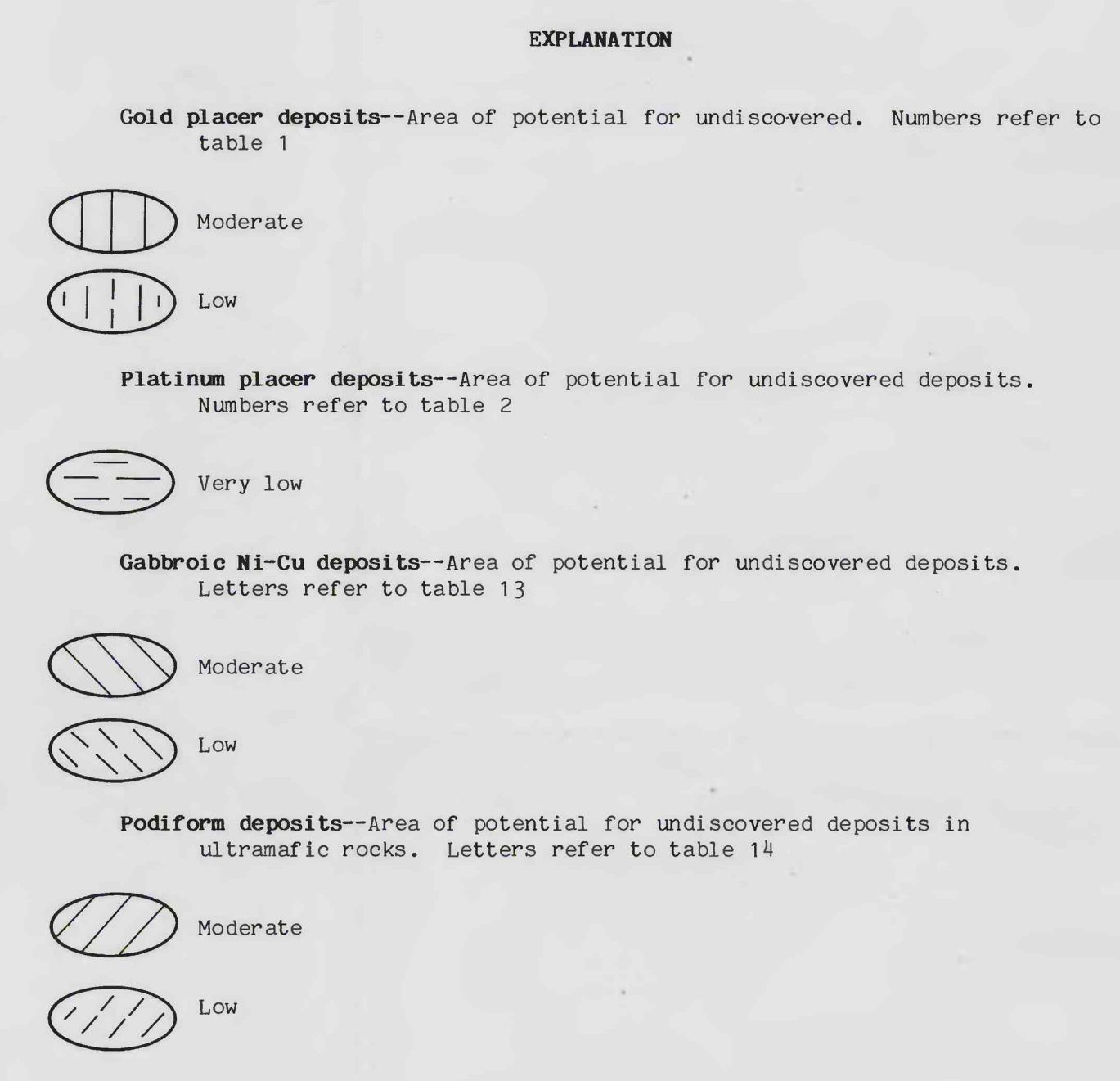
Description of recognition criteria  
1. Geologically favorable environment of metapelite-structured mafic or ultramafic rocks, associated mafic intrusive rocks, or cumulate mafic or ultramafic rocks.  
2. Known deposit, prospect, or occurrence.  
3. Tectonic emplacement.

### GOLD PLACER AND PLATINUM PLACER DEPOSITS AND GABBROIC Ni-Cu AND PODIFORM CHROMITE DEPOSITS

### METALLIFEROUS MINERAL RESOURCE ASSESSMENT MAPS OF THE MOUNT HAYES QUADRANGLE, EASTERN ALASKA RANGE, ALASKA

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### GOLD PLACER AND PLATINUM PLACER DEPOSITS AND GABBROIC Ni-Cu AND PODIFORM CHROMITE DEPOSITS



**DESCRIPTION OF MAP UNITS**  
**Qs** Surficial deposits (Quaternary)—Alluvium, colluvial deposits, glacial deposits, fluviolacustrine deposits, rock glacier deposits, snow and ice  
**gr** Granitic plutonic rocks (early Tertiary) (see text). Chiefly medium- to coarse-grained biotite-hornblende granite and hornblende-biotite granodiorite, with lesser quartz diorite and quartz monzonite. Form moderate to large plutons and sparse dikes. Locally schistose and recrystallized at lower greenschist facies. Individual plutons generally fault bounded in area south of Denali fault. Local intense hydrothermal alteration.  
**Tsc** Sandstone, conglomerate, and coal (middle or early Tertiary). Chiefly conglomerate at the base grading upward into interbedded sandstone and coal. Overlain by interbedded layers of poorly consolidated siliceous, mafic, and quartz sandstone. Includes locally extensive coal deposits in vicinity of Jarvis Creek  
**la** Lamprophyre and alkalic gabbro (early Tertiary)—Chiefly pantomorphite-granular aggregates of olivine, orthopyroxene, clinopyroxene, hornblende, biotite, plagioclase, and potassium-feldspar containing various amounts of groundmass, fine-grained hornblende, biotite, plagioclase, and opaque and interstitial or replacement carbonates. Locally embayed phenocrysts. Occur in small- to moderate-size plutons and dikes south of Denali fault  
**m** Mesozitic and monzonitic (Tertiary) and Cretaceous)—Gabbro and metabasalt with lesser diabase, varying from mainly hypocrystalline-granular to ophitic aggregates of hornblende, plagioclase, and lesser biotite to metabasalt composed of schistose aggregates of actinolite, chlorite, biotite, epidote, and albite. Occur in narrow dikes to small- to moderate-size plutons  
**Gb** Gabbro and mafic plutonic rocks (Tertiary) and Cretaceous)—Gabbro and metabasalt with lesser diabase, varying from mainly hypocrystalline-granular to ophitic aggregates of hornblende, plagioclase, and lesser biotite to metabasalt composed of schistose aggregates of actinolite, chlorite, biotite, epidote, and albite. Occur in narrow dikes to small- to moderate-size plutons  
**Yukon-Tanana Terrane**  
**La** Augen gneiss and schist (Mesoproterozoic)—Coarse- to medium-grained augen gneiss and schist composed of schistose aggregates of potassium feldspar, plagioclase, biotite, and quartz. Locally deformed and regionally metamorphosed at amphibolite facies into mylonitic gneiss and schist. Occur in moderate- to large-size irregularly shaped, heterogeneous plutons surrounding schistose granitic plutons and pelitic schists. Reflect hypocrystalline granular texture with quartz-plagioclase feldspar phenocrysts. Locally deformed and retrograded to lower greenschist facies  
**Igr** Medium-grained gneissic rocks (Devonian)—Chiefly gneissic hornblende-biotite schist and lesser quartz diorite. Reflect hypocrystalline granular texture. Locally deformed and regionally metamorphosed at amphibolite facies into mylonitic gneiss. Locally deformed and retrograded to lower greenschist facies  
**Co** Coarse-grained pelitic schist (Devonian or older)—Poly deformed, coarse-grained pelitic massive quartzite, garnet schist derived from quartz-rich to clay rich shale. Ductily deformed and regionally metamorphosed at amphibolite facies into mylonitic schist. Locally deformed and retrograded to lower greenschist facies  
**Mac** Macromylonite  
**Mg** Metamorphosed granitic rocks (Devonian)—Chiefly fine- to medium-grained gneissic granite and granodiorite with lesser quartz diorite and diorite. Ductily deformed and regionally metamorphosed into mylonitic gneiss at epizone amphibolite facies. Form irregularly shaped plutons and dikes intruding pelitic schist, calc-schist, and quartz-feldspar schist. Locally deformed and retrograded to lower greenschist facies  
**ms** Metamorphosed pelitic, calcareous, and quartz-feldspar sedimentary rocks (Devonian or older)—Medium-grained, polydeformed, biotite-muscovite-quartz pelitic schist, garnet-plagioclase schist, and quartz-plagioclase biotite schist derived from shale, mud, and sandstone. Ductily deformed and regionally metamorphosed at epizone amphibolite facies into fine- to medium-grained mylonitic schist. Locally deformed and retrograded to lower greenschist facies  
**Jarvis Creek Glacier subterranean**  
**Jc** Fine- to medium-grained pelitic schist and quartzite (Devonian)—Chiefly polydeformed, fine-grained pelitic schist and quartzite with lesser calc-schist, quartz-feldspar schist, and marble, and with very sparse schistose metamorphosed rocks. Metasedimentary rocks derived from shale, chert or quartz sandstone, mud, volcanic graywacke, and limestone. Ductily deformed and regionally metamorphosed at greenschist facies into mylonitic schist or local phyllite. Local intense iron staining, and disseminated and massive sulfide minerals  
**Haves Glacier subterranean**  
**Hg** Fine-grained schistose volcanic rocks and pelitic schist (Devonian)—Chiefly polydeformed, fine-grained, schistose meta andesite and metagabbro with lesser metaandite, metabasalt, pelitic schist, quartz, calc-schist, and marble. Ductily deformed and regionally metamorphosed at greenschist facies into mylonitic schist or local phyllite. Local intense iron staining, and disseminated and massive sulfide minerals  
**Maclaren Glacier subterranean**  
**Ma** Fine-grained schistose volcanic rocks and pelitic schist (Devonian)—Chiefly polydeformed, fine-grained pelitic schist and quartzite with lesser calc-schist, quartz-feldspar schist, and marble, and with very sparse schistose metamorphosed rocks. Metasedimentary rocks derived from shale, chert or quartz sandstone, mud, volcanic graywacke, and limestone. Ductily deformed and regionally metamorphosed at greenschist facies into mylonitic schist or local phyllite. Local intense iron staining, and disseminated and massive sulfide minerals  
**Maclaren Peak Terrane**  
**Ma** Metamorphosed gabbro, quartz diorite, granodiorite, and granite (Late Cretaceous)—Regionally metamorphosed plutonic rocks consisting of gabbro, quartz diorite, granodiorite, and granite, and amphibolite derived from gabbro and diorite. Occur in east-striking plutons and dikes intruding pelitic schist, calc-schist, and quartz-feldspar schist. Reflect hypocrystalline granular texture. Ductily deformed and deformed twice, once into mylonitic schist during an earlier period of upper amphibolite facies metamorphism, and later into blastomylonite during a period of middle greenschist facies metamorphism  
**Windy Terrane**  
**W** Argillite, siltstone, graywacke, and limestone (Devonian and Silurian)—Chiefly weakly metamorphosed phyllite, quartz, pelitic schist, quartz sandstone, graywacke, and limestone. Limestone, and mud, and siltstone abundant and locally massive. Occur in narrow, steeply faulted locally, with development of phyllite and protomylonite in narrow shear zones. Exhibit incipient lower greenschist facies metamorphism

### CORRELATION OF MAP UNITS

