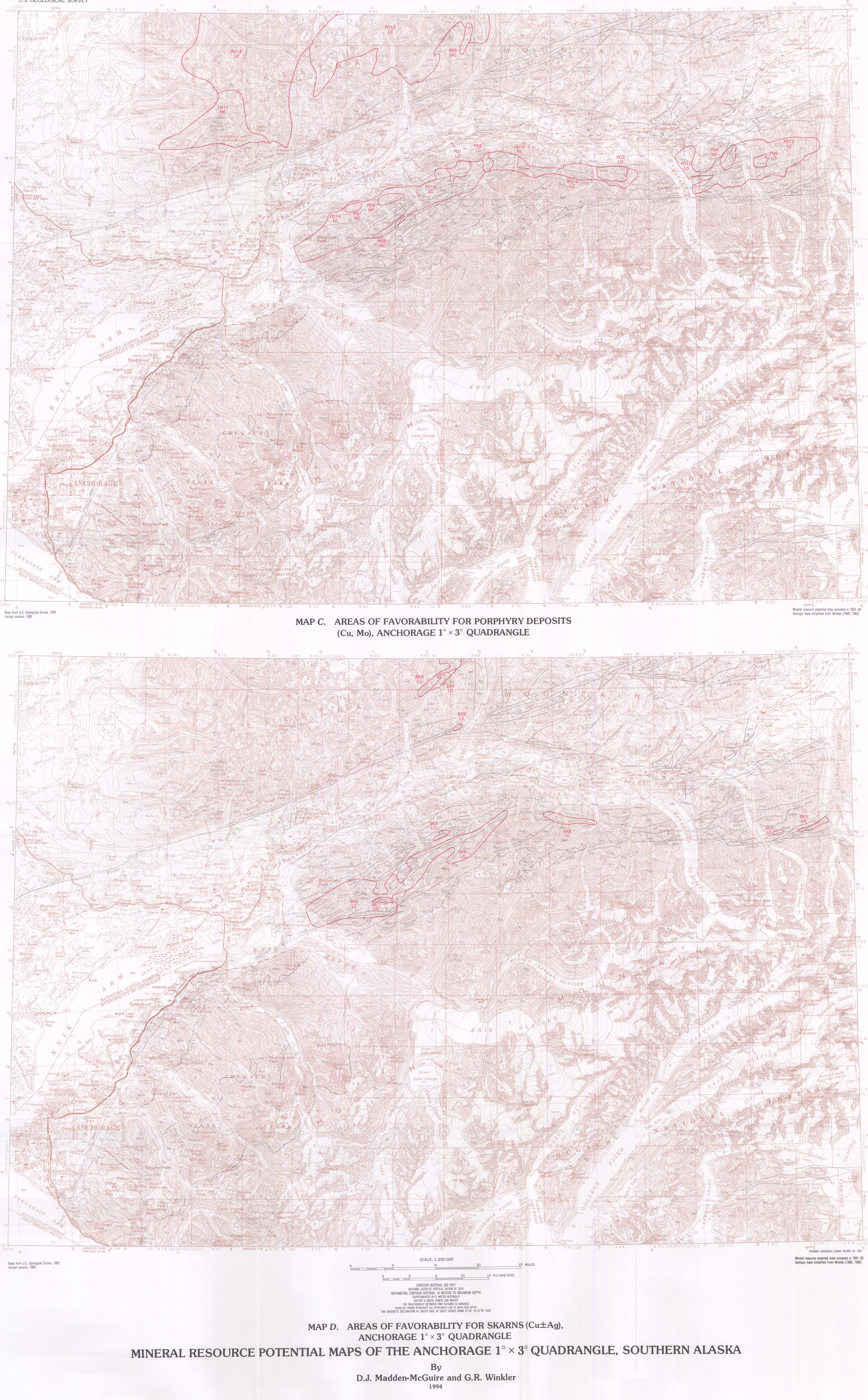
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I–2393 (SHEET 2 OF 3)
Explanatory pamphlet accompanies map



EXPLANATION OF RESOURCE POTENTIAL

[See pamphlet text and tables for descriptions of areas. See table 2 in pamphlet for definitions of levels of resource potential]

PO1 — **Area of favorability for porphyry copper deposits**

LEVELS OF RESOURCE POTENTIAL

POTENTIAL	LEVEL OF CERTAINTY
L=LOW	B
M=MODERATE	C INCREASING
H=HIGH	D

CORRELATION OF MAP UNITS

ALL MAP AREAS

Unconsolidated deposits

- g, Qs — Holocene — QUATERNARY

NORTH OF BORDER RANGES FAULT

Bedded rocks

- Ttk — Miocene
- Ts — Oligocene and Eocene
- Tc, Tar — Eocene and Paleocene
- Tv — Miocene(?) to Paleocene — TERTIARY
- Km — Late and Early Cretaceous — CRETACEOUS
- Ju — Late and Middle Jurassic — JURASSIC
- JTkt — Early Jurassic
- Tkl — Late Triassic(?) — TRIASSIC(?)

Intrusive rocks

- Ti — Eocene
- TKi — Paleocene — TERTIARY
- Kw — Late Cretaceous
- Kum — Early Cretaceous — CRETACEOUS
- Kt — Late Jurassic
- Jtr — Middle Jurassic — JURASSIC
- Jgd, Jqd — Early Jurassic
- Jmip, Jg, Jum

Metamorphic rocks

- Jps, JPm — JURASSIC(?) JURASSIC TO MIDDLE PALEOZOIC(?)

SOUTH OF BORDER RANGES FAULT

Bedded rocks

- To — Eocene and Paleocene
- Kv — Late Cretaceous — TERTIARY, CRETACEOUS
- Mzm — MESOZOIC

Intrusive rocks

- Tmb, Tgg, Tfp — Oligocene, Oligocene or Eocene, Eocene — TERTIARY

DESCRIPTION OF MAP UNITS

ALL AREAS

Unconsolidated deposits

g — **Glaciers and superglacial moraine (Holocene)**

Qs — **Surficial deposits (Quaternary)**—Undivided glacial, alluvial, colluvial, and lacustrine deposits, rock glaciers, and landslides

NORTH OF BORDER RANGES FAULT

Bedded rocks

Ttk — **Tyonek Formation (Miocene)**—Carbonaceous sandstone, siltstone, shale, and claystone

Tv — **Volcanic rocks (Miocene? to Paleocene)**—Bimodal volcanic flows, tuffs, and hypabyssal intrusions and minor intercalated sedimentary rocks

Ts — **Sedimentary rocks, undivided (Oligocene and Eocene)**—Tsadaka Formation (Oligocene) and Wishbone Formation (Eocene). Fluviatile conglomerate, sandstone, siltstone, and claystone, with local partings of ash

Tc — **Chickaloon Formation (Eocene and Paleocene)**—Fluviatile and alluvial carbonaceous mudstone, siltstone, conglomeratic sandstone, and conglomerate; middle and upper parts contain numerous beds of bituminous coal

Tar — **Arkose Ridge Formation (Eocene and Paleocene)**—Fluviatile and alluvial feldspathic, biotitic, and carbonaceous sandstone, conglomerate, siltstone, and shale

Km — **Matanuska Formation (Late and Early Cretaceous)**—Marine shale, siltstone, sandstone, and subordinate conglomerate

Ju — **Naknek Formation (Late Jurassic), Chinitna Formation (Middle Jurassic), and Tuxedni Group (Middle Jurassic), undivided**—Marine siltstone, shale, sandstone, and conglomerate

JTkt — **Talkeetna Formation (Early Jurassic and Late Triassic?)**—Mafic to intermediate flows, flow breccia, tuff, shallow sills, and agglomerate and subordinate interbedded sandstone and conglomerate and marine siltstone and shale

Tkl — **Limestone and marble (Late Triassic?)**—Massive to poorly bedded limestone interbedded with rocks mapped as part of Talkeetna Formation and also as roof pendants

Intrusive rocks

Ti — **Hypabyssal intrusions (Eocene)**—Stocks, dikes, and sills of mafic, intermediate, and felsic igneous rocks

TKi — **Intrusive rocks, undivided (Paleocene and Late Cretaceous)**—Composite epizonal or mesozonal pluton consisting principally of granite and tonalite, but also containing granodiorite, quartz monzonite, and quartz diorite. Age is Late Cretaceous and early Paleocene

Kw — **Willow Creek pluton (Late Cretaceous)**—Pervasively altered, zoned pluton consisting of a granodiorite, quartz monzodiorite, and quartz monzonite core and a quartz diorite and tonalite margin

Kum — **Serpentinized ultramafic rocks (Late Cretaceous)**—Small, discordant bodies of serpentinized ultramafic rocks

Kt — **Leucotonalite and trondhjemite (Early Cretaceous)**—Plugs and elongate, sill-like bodies of leucocratic plutonic rocks

Jtr — **Trondhjemite (Late Jurassic)**—Discordant, faintly foliated, leucocratic, epizonal plutons that contain large screens of quartz diorite and amphibolite

Jgd — **Granodiorite (Middle Jurassic)**—Large, epizonal pluton and satellitic stocks of granodiorite and lesser tonalite and quartz diorite

Jqd — **Quartz diorite (Middle Jurassic)**—Large, discordant, sheared and altered, epizonal pluton consisting predominantly of medium-grained quartz diorite and lesser diorite and tonalite

Jmip — **Mafic and intermediate plutonic rocks (Middle and Early Jurassic)**—Complexly intermixed series of mafic to intermediate, coarse- to fine-grained plutonic rocks consisting of sheared and altered gabbronorite, hornblende gabbro, diorite, quartz diorite, and tonalite

Jg — **Gabbronorite (Middle and Early Jurassic)**—Fine- to coarse-grained gabbroic rocks; intensely sheared and altered locally with minor amounts of serpentinized ultramafic rocks

Jum — **Ultramafic and mafic rocks (Middle and Early Jurassic)**— Cumulate dunite, pyroxenite, peridotite, and gabbronorite forming two large fault-bounded sequences in the northern Chugach Mountains, the informally named Eklutna complex of Clark and Greenwood (1972) and the Wolverine Complex of Carden and Decker (1977)

Metamorphic rocks

Jps — **Pelitic schist (Jurassic?)**—Homogenous pelitic schist known to occur only in the Willow Creek mining district of the southwestern Talkeetna Mountains

JPm — **Metamorphic rocks, undivided (Jurassic to middle Paleozoic?)**—Intricately intermixed amphibolite, foliated quartz diorite, and lesser trondhjemite in the southern Talkeetna Mountains and diverse metasedimentary and metavolcanic rocks cropping out near plutonic rocks along northern flank of the Chugach Mountains

SOUTH OF BORDER RANGES FAULT

Bedded rocks

To — **Orca Group (Eocene and Paleocene)**—Complexly deformed flysch and tholeiitic volcanic rocks consisting of sandstone, siltstone, mudstone, and conglomerate and interbedded basaltic flows, pillow breccia, and tuff

Kv — **Valdez Group (Late Cretaceous)**—Complexly deformed, foliated flyschoid metasedimentary rocks including metasandstone, metasiltstone, argillite, slate, and phyllite and rare beds of pebbly argillite and metasandstone and minor interbedded mafic metatuff

Mzm — **McHugh Complex (Mesozoic)**—Strongly deformed, melange-like assemblage between the Eagle River and Border Ranges faults consisting of argillite with wispy lenses of green chloritized tuff, thinly bedded siliceous argillite and argillaceous chert, within which are enclosed tracts of aligned phacoids of diverse extraformational lithologies including schist, amphibolite, marble, sandstone, conglomerate, diorite, gabbro, serpentinized ultramafic rocks, and mafic volcanic rocks

Intrusive rocks

Tmb — **Miners Bay pluton (Oligocene)**—Composite pluton consisting of texturally variable gabbroic and dioritic rocks intruded by slightly younger, altered, medium-grained biotite granite

Tgg — **Granite and granodiorite (Oligocene or Eocene)**—Small plutons and numerous leucocratic dikes with low color indices (ranging from 5 to 20) and abundant alkali feldspar

Tfp — **Felsic intrusions (Eocene)**—Altered, fine-grained, porphyritic dacite and rhyolite dikes, sills, and small stocks occurring widely south of the Border Ranges fault

——— **Contact**—Approximately located; dotted where concealed; queried where inferred

——— **High-angle fault**—Approximately located; dotted where concealed

——▲——▲—— **Thrust fault**—Approximately located; dotted where concealed; sawteeth on upper plate

EXPLANATION OF RESOURCE POTENTIAL

[See pamphlet text and tables for descriptions of areas. See table 2 in pamphlet for definitions of levels of resource potential]

SK8 — **Area of favorability for skarns (Cu, Ag)**

LEVELS OF RESOURCE POTENTIAL

POTENTIAL	LEVEL OF CERTAINTY
L=LOW	B
M=MODERATE	C INCREASING
H=HIGH	D

CONVERSION FACTORS

Multiply	By	To obtain
inches (in)	2.54	centimeters (cm)
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)

MAP C. AREAS OF FAVORABILITY FOR PORPHYRY DEPOSITS (Cu, Mo), ANCHORAGE 1° × 3° QUADRANGLE

MAP D. AREAS OF FAVORABILITY FOR SKARNS (Cu±Ag), ANCHORAGE 1° × 3° QUADRANGLE

MINERAL RESOURCE POTENTIAL MAPS OF THE ANCHORAGE 1° × 3° QUADRANGLE, SOUTHERN ALASKA

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