

**DESCRIPTION OF MAP UNITS**

**MIDDLE PROTEROZOIC (900-1,600 Ma)**

- Sherman Granite of Laramie Range (age ~1,400 Ma) and biotite-muscovite granite of Central Plains orogen
- Aorotholite of Laramie Range

**MIDDLE AND EARLY PROTEROZOIC**

- Granitoid rocks in Central Plains orogen (age uncertain)
- Magnetite-bearing granitoid rocks in Central Plains orogen (age uncertain)

**EARLY PROTEROZOIC (1,600-2,500 Ma)**

- Sioux Quartzite
- Granite of Haystack Range (age 1,720 Ma) of Harville uplift and Harney Peak Granite (1,710 Ma) of Black Hills uplift
- Diorite of Twin Hills (age 1,740 Ma) of Harville uplift
- Granite to diorite of Central Plains orogen—Foliated at places
- Metamorphic rocks of Central Plains orogen (age 1,630-1,800 Ma)
- Granite-gneissolite—Comprises a probable batholith in south-central South Dakota
- Quartzite and sillimanite schist of Black Hills uplift
- Quartz-mica schist, phyllite, metabasalt, and metagranite of Black Hills uplift (age 1,870-2,000 Ma); includes some rocks older than unit X<sub>1</sub>
- Volcanic and granitoid rocks, undivided, of Penobscot orogen (age 1,550-1,870 Ma)
- Gneiss of Penobscot orogen—Probably metagranite
- Mafic to felsic volcanic rocks and sedimentary rocks—Supracrustal rocks of Archean basement of Superior orogen
- Gabbroic and troctolitic rocks—Commonly layered
- Dominantly arc-derived rocks of central magnetic region with scattered Archean crust, Trans-Hudson orogen
- Relatively dense rocks in central magnetic region—Possibly intermediate-mafic volcanic rocks mainly of Early Proterozoic age
- Arc-derived rocks and backarc basin deposits of western magnetic region and scattered Archean crust, Trans-Hudson orogen
- Relatively dense rocks in western magnetic region—Possibly intermediate-mafic volcanic rocks mainly of Early Proterozoic age
- Synite-muscovite at granitic metamorphic facies in western magnetic region, Trans-Hudson orogen
- Mafic and ultramafic intrusions in Superior-Churchill boundary zone (DNR)
- Quartzite, talcose, conglomerate, and marble of Black Hills uplift (age >2,170 Ma)

**EARLY PROTEROZOIC AND LATE ARCHEAN**

- Rocks of Superior-Churchill boundary zone
- Rocks of Black Hills domain, Trans-Hudson orogen
- Gneiss and epiclastic sedimentary rocks of Superior orogen—Sedimentary rocks probably equivalent to unit X<sub>1</sub>

**LATE ARCHEAN (2,500-3,000 Ma)**

- Granitic rocks—Superior greenstone-granite terrane, probably mostly deformed granitoid rocks
- Granitoid rocks—Granite to tonalite of 2,650-2,750 Ma age group in Superior greenstone-granite terrane
- Granite of Laramie batholith (age 2,567±25 Ma), Laramie Range and granite of Black Hills uplift, Harville uplift
- Granite of gneiss terrane of Superior orogen (age 2,600 Ma)
- Metamorphosed sedimentary and volcanoclastic rocks, locally migmatitic, in Superior greenstone-granite terrane
- Gneiss and schist of Laramie Range
- Schist and metachert of Harville uplift
- Banded iron-formation and interbedded metavolcanic rocks, in Superior greenstone-granite terrane
- Diorite, in Superior greenstone-granite terrane
- Gabbro and related mafic rocks, in Superior greenstone-granite terrane
- Metamorphosed mafic-intermediate volcanic rocks, in Superior greenstone-granite terrane
- Metavolcanic and metasedimentary rocks of Laramie Range

**ARCHEAN (2,500-3,000 Ma)**

- Migmatitic and granitoid gneiss of Wyoming orogen and gneiss terrane of Superior orogen (age 2,600-3,600 Ma)

**EXPLANATION**

- Approximate contact—Based on exposures in the Black Hills uplift, Harville uplift, and Laramie Range, and on geophysical and geophysical data elsewhere
- Inferred contact—Based solely on geophysical data
- Fault or shear zone—Based mainly on geophysical and geophysical data. The Harville batholith fault was mapped in outcrop (Snyder, 1980) and the Cheyenne belt is projected from outcrop (Snyder, 1980) and the Cheyenne belt is projected from outcrop (Snyder, 1980)
- High-angle fault—Bar and ball on downthrown side, dip shown where known; arrows indicate direction of relative horizontal movement
- Thrust fault—Sawtooth on upper plate
- High-angle reverse fault—Hachure on downthrown side
- Trend of magnetic anomaly
- Drift lake on Precambrian basement
- Structure contours drawn on the Precambrian bedrock surface—Datum is mean sea level. Contour interval 200 ft; 1:200 ft in areas of sparse data. Contours not shown in outcrop areas in Black Hills uplift, Harville uplift, and Laramie Range

**REFERENCES**

Karlstrom, K.E., and Houston, R.S., 1984, The Cheyenne belt—Analysis of a Proterozoic suture in southern Wyoming. *Precambrian Research*, v. 25, p. 115-145.

Sims, P.K., 1990, Precambrian basement map of the midcontinent region, U.S.A. U.S. Geological Survey Miscellaneous Investigations Series Map I-853A, scale 1:1,000,000.

Snyder, G.L., 1980, Map of Precambrian and adjacent Proterozoic rocks of the Harville Uplift, Goshen, Niobrara, and Platte Counties, Wyoming. U.S. Geological Survey Open-File Report 80-779, 11 p.

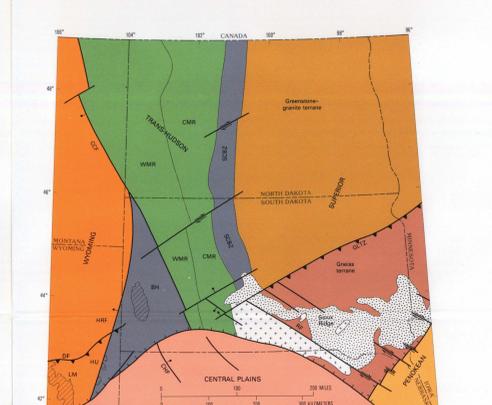


Figure 2.—Tectonic map of Precambrian basement, northern Great Plains, U.S.A., showing the Superior and Wyoming cratons and the Trans-Hudson, Penobscot, and Central Plains orogens. BH, Black Hills uplift within Black Hills domain of Trans-Hudson orogen; CB, Cheyenne belt; CCF, Cedar Creek fault; CMR, Central magnetic region of Trans-Hudson orogen; DP, Douglas fault; GLT, Great Lakes tectonic zone; HRF, Harville-Rainbow fault; HU, Harville uplift; LM, Laramie Mountains; NP, Niobrara fault; SCZ, Superior-Churchill boundary zone of Trans-Hudson orogen; WMR, Wyoming magnetic region of Trans-Hudson orogen.

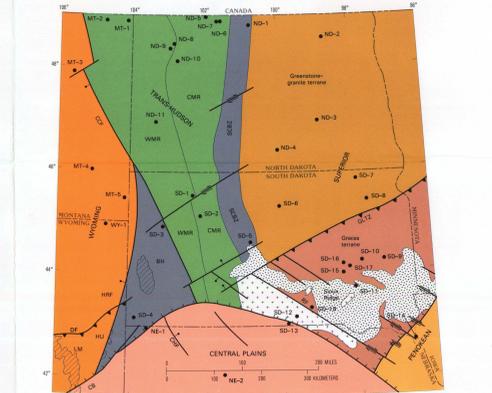


Figure 3.—Map showing location of isotopically dated samples. Numbers refer to map numbers listed in Appendix A; abbreviations are the same as on figure 2.

**CONVERSION FACTORS**

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

This map is a companion to a series of maps and cross sections of the northern Great Plains area, bounded by 95°-105°W and 38°-48°N, prepared under the Midcontinent Strategic and Critical Minerals Project. Precambrian basement map of the area compiled by P.K. Sims. This companion map was compiled to provide a better geologic framework of the Precambrian basement in north-central United States. Contributions were made by M.P. Carlson (Nebraska), J.S. Klauer and R.A. Sisson (South Dakota), J.S. Klauer and F.R. Horner (North Dakota), G.B. Moore (Minnesota), and Sharon E. Lewis and Richard Wise (Montana), including contributions by P.K. Sims and Z.E. Peterman.

**PRECAMBRIAN BASEMENT MAP OF THE TRANS-HUDSON OROGEN AND ADJACENT TERRANES, NORTHERN GREAT PLAINS, U.S.A.**

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