



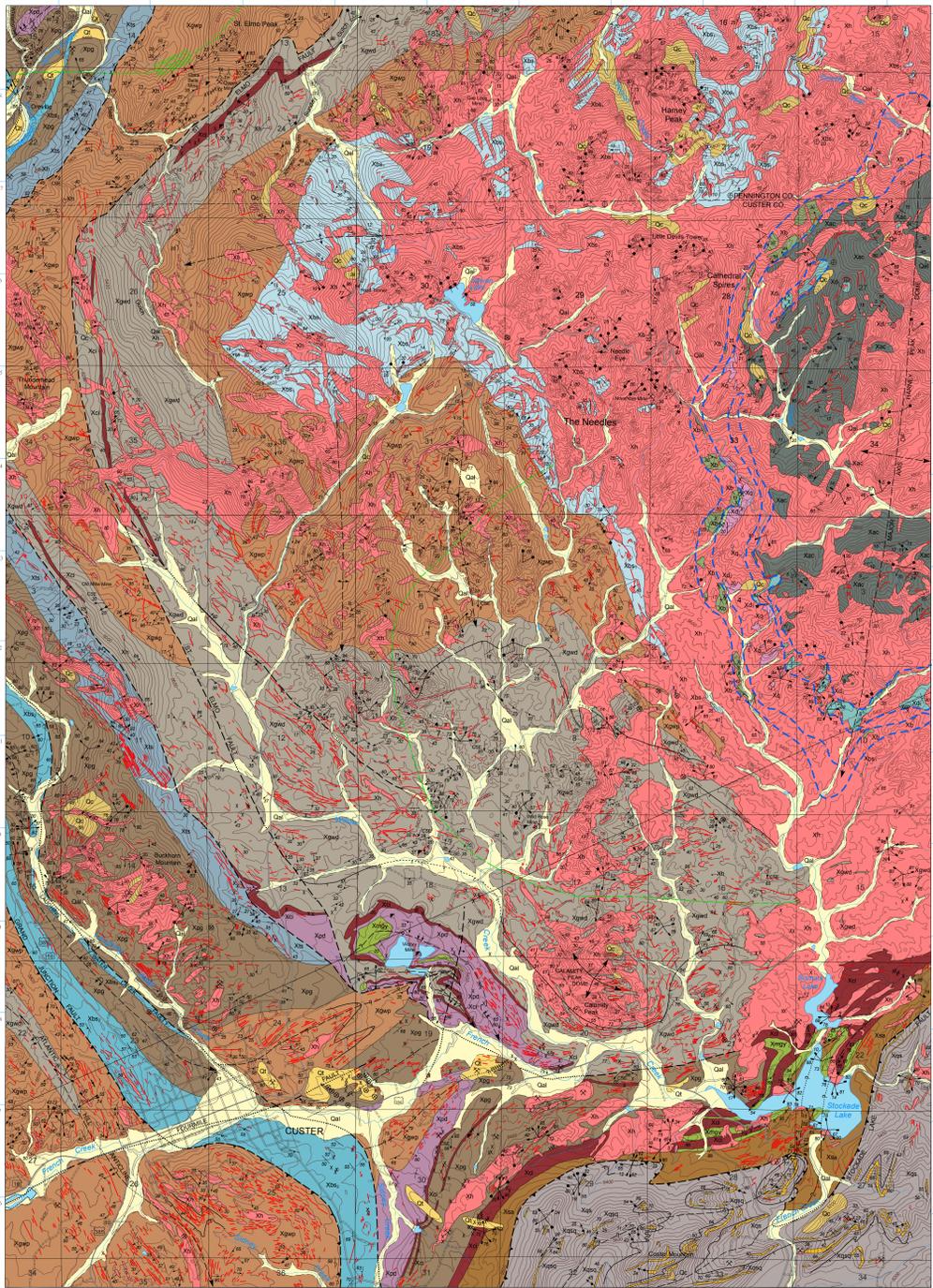
Geologic Map of the Custer Quadrangle, South Dakota

Prepared in cooperation with the South Dakota
School of Mines and Technology

State of South Dakota
M. Michael Rounds, Governor

J.A. Redden, D. Nonnast, and D. Siren
2001

South Dakota Geological Survey
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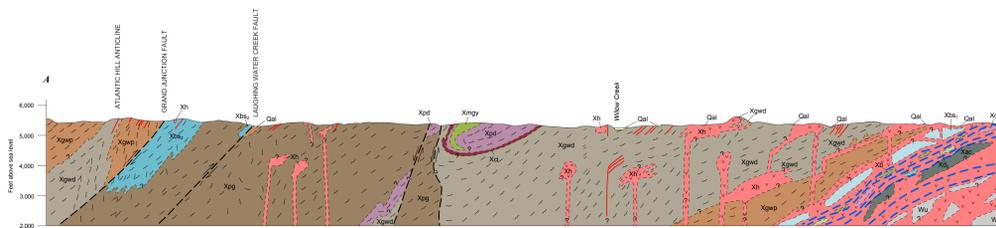
Map base modified from U.S. Geological Survey 1:24,000-scale Custer digital line graph.
Projection is Universal Transverse Mercator, Zone 13.
Datum is 1983 North American.

SCALE 1:24,000

Digital Cartography by B.A. Fagnan, L.L. Ronstad, and E.S. Beck
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The Geological Survey, Department of Environment and Natural Resources, engages in an ongoing data collection and interpretation process. An outcome of that process is to reflect those interpretations on maps such as this one. Reasonable efforts have been made to ensure that this map accurately reflects the source data used in its preparation. This map is date specific. As additional data become available, geologic interpretations may be revised and the map may be updated by the Geological Survey. This map should not be enlarged or otherwise used in an attempt to interpret more detail than can be seen at a scale of 1:24,000.

CONTOUR INTERVAL 40 FEET



EXPLANATION

Quaternary	Qal Alluvium - Unconsolidated to moderately consolidated, angular to rounded, clay to boulder-size clasts. Deposited in present-day drainages and on floodplains.	Qc Colluvium - Unconsolidated, generally angular, clay to boulder-size clasts. Locally derived and deposited along steep slopes.	Qt Terrace deposit - Undifferentiated deposits of unconsolidated to moderately consolidated, angular to rounded, clay to boulder-size clasts. Occurs as much as 40 feet (12 m) above present drainages.	Unconformity	Xh Harney Peak Granite - Fine-grained to pegmatitic, S-type granite, typically layered. Batholith consists of many individual sills and dikes and its contact is approximate. Dominant minerals include oligoclase, microcline, perthite, quartz, and muscovite with minor biotite and ilmenite. Isolated sills, dikes, and small bodies are similar to the central granite mass. Some are zoned pegmatites. Sills and dikes in contact with a larger body are thin extensions and boundary contact with larger body should be ignored. Age 1.715 Ga.	Xmgy Metagabbro - Sills and dikes of dark green hornblende-plagioclase amphibolite. Protolith is gabbro.	Xqc Quartzite and schist - Xqs - thick-bedded quartzite with interbeds of quartz-mica schist and quartz-biotite-sillimanite schist. Xqs - massive quartzite beds. Xqs unit bounded by fault contacts, relative age uncertain. Protolith is sandstone and shale.	Xsa Sillimanite schist and andalusite schist - Includes garnetiferous quartz-mica schist and minor medium-bedded quartzite. Protolith is shale.	Xbs Garnet schist and biotite schist - Typically thin-bedded; locally contains graphite, sulfides, and thin quartzite beds. Equivalent to part of the Oreville Formation in the Hill City quadrangle (Ratleff and Wayland, 1969). Protolith is black shale.	Xts Mica schist and sillimanite schist - Thin- to medium-bedded; contains andalusite nodules replaced by muscovite and sparse malachite staining. Equivalent to the magnetite-bearing mica schist unit in the Berne quadrangle. Originally described as part of the "stratigraphy east of the Grand Junction Fault" in the Berne quadrangle (Redden, 1968). Protolith is tuff and shale.	Xci Banded iron-formation - Quartzite and cummingtonite-garnetiferous schist; varied between massive striated quartzite and interbedded thin quartzite and cummingtonite beds. Pyroxene-bearing near Stockade Lake. Typically iron-stained, sulfide-bearing where unweathered. Unit is tectonically and probably repeated at several stratigraphic levels. Protolith is chert and carbonate-facies iron-formation.	Xpd Garnet-sillimanite schist and quartz-mica schist - Typically medium-bedded; locally with biotite clasts of quartzose schist and quartzite. May occur at different stratigraphic levels. Protolith is shale and debris flow deposits.	Xqp Quartz-mica schist and mica schist - May contain minor amounts of staurolite, garnet, sillimanite, or andalusite; sillimanite and andalusite typically replaced by muscovite. Originally described as part of the "stratigraphy east of the Grand Junction Fault" in the Berne quadrangle (Redden, 1968). Protolith is graywacke turbidite deposits.	Xgwd Metagraywacke - Thin- to medium-bedded, grayish-tan quartz-mica schist. May contain garnet, staurolite, or andalusite in the northwest corner of the quadrangle and near Custer; typically contains nodules of sillimanite. Equivalent to part of the Bugtown Formation in the Berne quadrangle (Redden, 1968). Protolith is graywacke turbidite deposits, distal facies.	Xgwp Metagraywacke - Thick-bedded, tan, quartzose schist with sparse garnet and sillimanite. Equivalent to part of the Bugtown Formation in the Berne quadrangle where an upper and lower unit is separated by Xgwd. May not be correlative across faults (Redden, 1968). Protolith is graywacke turbidite deposits, proximal facies, dominantly Bouma A beds.	Xbs Biotite-garnet schist and biotite schist - Thin-bedded mica schist with more massive quartzose beds. Fine- to medium-grained, locally graphic. Equivalent to the Louise Formation at Bear Mountain (Redden, 1968). Protolith is black shale.	Xb Amphibolite and amphibolite schist - Locally pyroxene-bearing. Occurs as isolated inliers within the Harney Peak Granite. Equivalent to part of the Vanderlehr Formation (Redden, 1968). Protolith is basalt or tuff.	Xds Marble and skarn - Occurs as isolated inliers within the Harney Peak Granite. Equivalent to part of the Vanderlehr Formation at Bear Mountain (Redden, 1968). Protolith is dolomite and limestone.	Xq Quartzite - Medium-bedded, glassy quartzite occurs as isolated inliers within the Harney Peak Granite. Equivalent to part of the Vanderlehr Formation at Bear Mountain (Redden, 1968). Protolith is sandstone.	Xds Marble and skarn - Occurs as isolated inliers within the Harney Peak Granite. Equivalent to part of the Vanderlehr Formation at Bear Mountain (Redden, 1968). Protolith is dolomite and limestone.	Xac Quartzite and metaconglomerate - Includes feldspathic quartzite. Occurs as isolated inliers within the Harney Peak Granite. Equivalent to part of the Vanderlehr Formation at Bear Mountain (Redden, 1968). Protolith is arkose, sandstone, and conglomerate.	Wu Undifferentiated Archean rocks - Shown only in cross section.	Contact Long dashed where approximately located.	Form line Indicates approximate dip direction of beds, dotted where concealed.	Ghost contact Based on inliers and remnants of metamorphic rock within the Harney Peak Granite, approximately located.	FAULTS	Fault Long dashed where approximately located, dotted where concealed, queried where probable. Bar and ball on downthrown side. Arrow indicates lateral movement.	Inferred thrust fault Long dashed where approximately located, dotted where concealed. Sawtooth indicate upper plate.	FOLDS	Anticline warp Showing crest line and direction of plunge. Long dashed where approximately located, dotted where concealed.	Syncline warp Showing trough line and direction of plunge. Long dashed where approximately located, dotted where concealed.	Overturned anticline Generalized trace of axial surface and dip direction of limbs. Long dashed where approximately located, dotted where concealed.	Overturned syncline Generalized trace of axial surface and dip direction of limbs. Long dashed where approximately located, dotted where concealed.	Fold axis Long dashed where approximately located, dotted where concealed, queried where probable. Type indeterminate where stereographic evidence uncertain. Minor beds not shown. At least two fold axes are apparent.	Inclined minor fold axis Showing bearing and plunge.	Horizontal minor fold axis Showing bearing.	Dome Long dashed where approximately located, dotted where concealed.	STRIKE AND DIP OF BEDDING	Inclined Symbols with granite indicate bedding of small metamorphic inliers.	Vertical Top of bed in dip direction.	Horizontal Symbols with granite indicate bedding of small metamorphic inliers.	Overturned Where direction of plunging is known.	Top of bed Shown by sedimentary structures.	STRIKE AND DIP OF FOLIATION	Inclined	Vertical	Parallel to bedding	DIP OF GRANITE OR PEGMATITE CONTACT	Inclined Showing dip direction and amount.	Vertical	LAYERING IN GRANITE	Inclined	Vertical	STRIKE AND DIP OF FRACTURES	Inclined	Vertical	Multiple	LINEAR STRUCTURES	Inclined lineation Showing bearing and plunge. CSE = calc-silicate ellipsoid; B = boudin.	Horizontal lineation Showing bearing. CSE = calc-silicate ellipsoid; B = boudin.	Vein	Metamorphic isograd KFS is potassium feldspar; STAUROLITE.	Open pit mine or glory hole	Mine adit	Trench	Prospect pit	Open of prospect pits	Mine shaft	Area of placer dredging
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Revision Date: June 28, 2007

Acknowledgements

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References

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