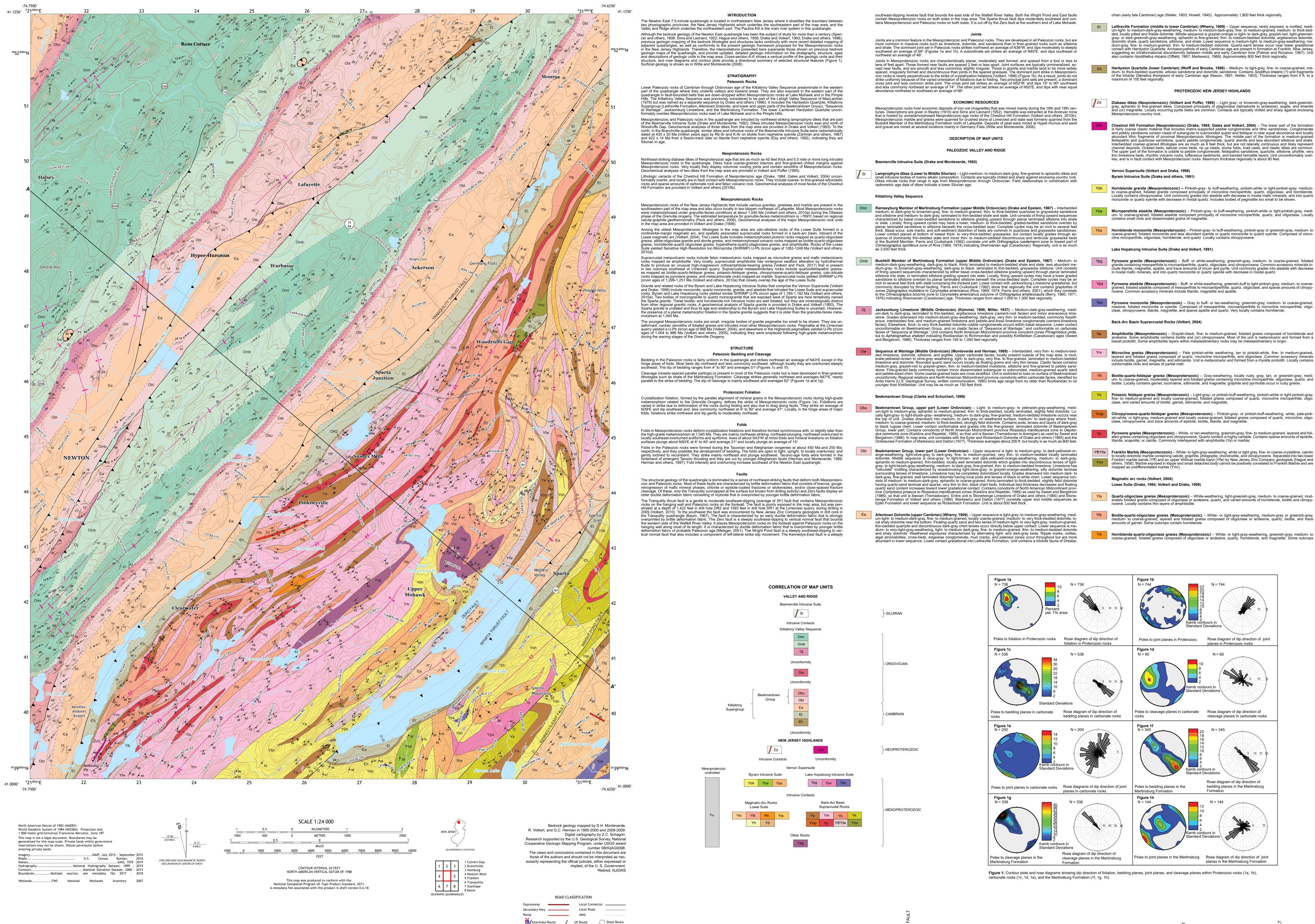
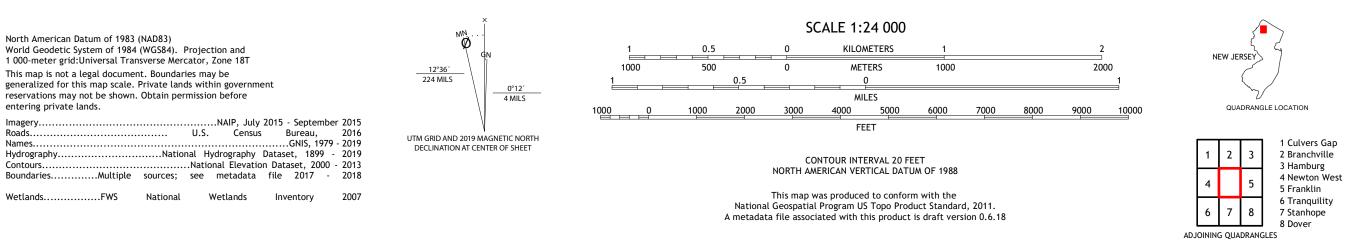
DEPARTMENT OF ENVIRONMENTAL PROTECTION WATER RESOURCES MANAGEMENT NEW JERSEY GEOLOGICAL AND WATER SURVEY





BEDROCK GEOLOGIC MAP OF THE NEWTON EAST QUADRANGLE SUSSEX COUNTY, NEW JERSEY

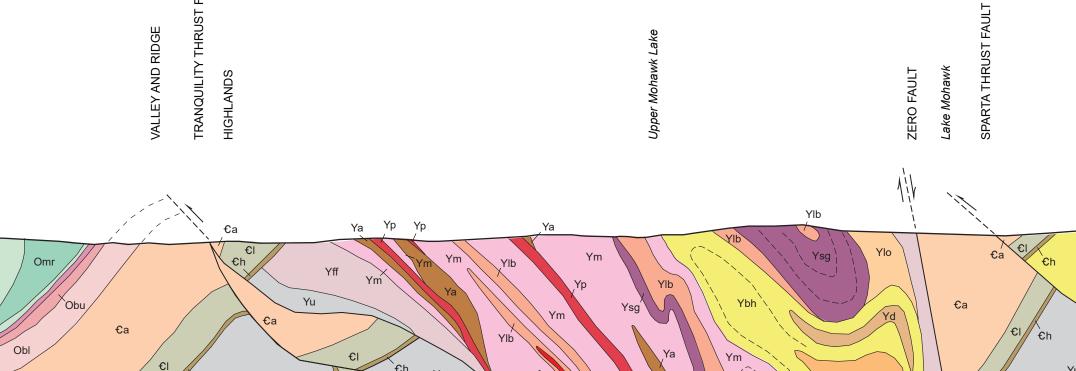
Ву

Donald H. Monteverde¹, Richard A. Volkert¹, Gregory C. Herman¹, and Zachary C. Schagrin 2022

Prepared in cooperation with the U.S. GEOLOGICAL SURVEY NATIONAL COOPERATIVE GEOLOGIC MAPPING PROGRAM



FEET 2.000 1,000 — SEA LEVEL--1,000— -2.000-3 000 NO VERTICAL EXAGGERATION.



BEDROCK GEOLOGIC MAP OF THE NEWTON EAST QUADRANGLE SUSSEX COUNTY, NEW JERSEY OPEN FILE MAP OFM 146

contain clinopyroxene. Locally interlayered with amphibolite. Albite-oligoclase gneiss (Mesoproterozoic) - Grayish-black, fine- to medium-grained, moderately foliated gneiss. Locally contains biotite, clinopyroxene, and/or orthopyroxene. Hypersthene-quartz-plagioclase gneiss (Mesoproterozoic) – Gray- or tan-weathering, greenish-gray or greenish-brown, medium-grained, moderately layered and foliated gneiss composed of andesine or oligoclase, quartz, clinopyroxene, horn-blende, and hypersthene. Commonly contains thin mafic layers.

Diorite (Mesoproterozoic) - Light-gray- or tan-weathering, greenish-gray or greenish-brown, medium- to medium-coarse-grained, massive, moderately foliated rock containing andesine or oligoclase, clinopyroxene, hornblende, hypersthene, and magnetite. Commonly contains thin mafic layers.

Other rocks

Sparta granite (Mesoproterozoic) - Tan- to buff-weathering, light-greenish-gray to pinkish-green, medium- to coarsened, massive, foliated monzogranite to guartz monzogranite composed of guartz, oligoclase, microperthite, biotite, hornolende, altered clinopyroxene, and magnetite. Relationship to rocks of the Byram and Lake Hopatcong Suites is uncertain. **Mesoproterozoic rocks, undifferentiated** – Shown in cross section only.

REFERENCES CITED

Baum, J.L., 1967, The Tranquility prospect, Sussex County, New Jersey: New Jersey Zinc Company, unpublished inter-office correspondence. On file in the office of the New Jersey Geological Survey, Trenton, New Jersey. Bayley, W.S., 1910, Iron mines and mining in New Jersey: New Jersey Geological Survey Bulletin 7, 512 p. Berry, W.B.N., 1960, Graptolite faunas of the Marathon region, west Texas: University of Texas Publication 6005, 179 p. , 1971, Late Ordovician graptolites from southeastern New York: Journal of Paleontology, v. 45, p. 633-640. . 1976. Aspects of correlation of North American shelly and graptolite faunas. in Basset, M.G., ed., The Ordovician System, Proceedings of a Paleontological Association Symposium: Birmingham, University of Wales Press, p. 153-169. Clarke, J.M., and Schuchert, C., 1899, The nomenclature of the New York series of geological formations: Science, new series, v. 10, p. 874-878. Drake, A.A., Jr., 1984, The Reading Prong of New Jersey and eastern Pennsylvania-An appraisal of rock relations and chemistry of a major Proterozoic terrane in the Appalachians, *in*, Bartholomew, M.J., ed., The Grenville event in the Appalachians and related topics: Geological Society of America Special Paper 194, p. 75-109. Drake, A.A., Jr., and Epstein, J. B., 1967, The Martinsburg Formation (Middle and Upper Ordovician) in the Delaware Valley, Pennsylvania-New Jersey: U.S. Geological Survey Bulletin 1244-H, p. H1-H16. Drake, A.A., Jr., Kastelic, R.L., Jr., and Lyttle, P.T., 1985, Geologic map of the eastern parts of the Belvidere and Portland quadrangles, Warren County, New Jersey: U.S. Geological Survey Miscellaneous Investigations Series Map I-1530, scale 1:24,000. Drake, A.A., Jr., Aleinikoff, J.N., and Volkert, R.A., 1991, The Byram Intrusive Suite of the Reading Prong-Age and tectonic environment, *in* Drake, A.A., Jr., ed., Contributions to New Jersey Geology: U.S. Geological Survey Bulletin 1952, p. D1-D14. Drake, A.A., Jr., and Monteverde, D.H., 1992, Bedrock geologic map of the Branchville quadrangle, Sussex County, New Jersey: U.S. Geological Survey Geologic Quadrangle Map GQ-1700, scale 1:24,000. Drake, A.A., Jr., and Volkert, R.A., 1991, The Lake Hopatcong Intrusive Suite (Middle Proterozoic) of the New Jersey Highlands, *in* Drake, A.A., Jr., ed., Contributions to New Jersey Geology: U.S. Geological Survey Bulletin 1952, p. A1-A9. , 1993, Bedrock geologic map of the Newton East quadrangle, Sussex County, New Jersey: U.S. Geological Sur-_____ vey Geologic Quadrangle Map GQ-1707, scale 1:24,000.

Drake, A.A., Jr., Volkert, R.A., Monteverde, D.H., Herman G.C., Houghton, H.F., Parker, R.A., and Dalton, R.F., 1996, Bed-rock Geologic Map of Northern New Jersey: U.S. Geological Survey Miscellaneous Investigations Series Map I-2540-A, scale 1:100,000. Eby, G.N., Sclar, C.B., and Myers, P.B., 1992, A fission-track date on magmatic titanite from the Beemerville nepheline syenite, Sussex County, N.J.: Geological Society of America Abstracts with Programs, v. 24, p. 18. Gates, A.E., and Volkert, R.A., 2004, Vestiges of an Iapetan rift basin in the New Jersey Highlands: Implications for the Neoproterozoic Laurentian margin: Journal of Geodynamics, v. 37, p. 381-409. Hague, J.M., Baum, J.L., Herrman, L.A., and Pickering, R.J., 1956, Geology and structure of the Franklin-Sterling area, New Jersey: Geological Society of America Bulletin. 67: 435-474. Herman, G.C., and Monteverde, D.H., 1989, Tectonic framework of northwestern New Jersey; bedrock structure and balanced cross sections of the Valley and Ridge province and southwest Highlands area, *in* Grossman, I.G., ed., Pa-leozoic geology of the Kittatinny Valley and southwest Highlands area: Field Guide and Proceedings, 6th Annual Meeting of the Geological Association of New Jersey, p. 1-57. Herman, G.C., Monteverde, D.H., Schlische, R.W., and Pitcher, D.M., 1997, Foreland crustal structure of the New York recess, northeastern United States: Geological Society of America Bulletin, v. 109, p. 955-977 Howell, B.F., 1945, Revision of Upper Cambrian faunas of New Jersey: Geological Society of America, Memoir 12, 46p. Karklins, O.L., and Repetski, J.E., 1989, Distribution of selected Ordovician conodont faunas in northern New Jersey: U.S. Geological Survey Miscellaneous Field Studies Map MF-2066, scale 1:185,000. Kummel, H.B., 1908, Paleozoic sedimentary rocks of the Franklin Furnace quadrangle, New Jersey, in Spencer, A.C., Kummel, H.B., Salisbury, R.D., Wolff, J.E., and Palache, Charles, Description of the Franklin Furnace quadrangle, New Jersey: U.S. Geological Survey Atlas Folio 161, p. 10-12.

MacLachlan, D.B., 1979, Geology and mineral resources of the Temple and Fleetwood quadrangles, Berks County, Pennsylvania: Pennsylvania Geological Survey Atlas 187a, b, scale 1:24,000 Markewicz, F.J., 1968, The Hardyston-Leithsville contact and significance of "Hyolithellus micans" in the lower Leithsville Formation: [abs.], New Jersey Academy of Science Bulletin, v. 13, p. 96. Markewicz, F.J., and Dalton, R.F., 1977, Stratigraphy and applied geology of the lower Paleozoic carbonates in northwest-ern New Jersey: *in* 42nd Annual Field Conference of Pennsylvania Geologists, Guidebook, p. 1-48. Metsger, R.W., 2001, Evolution of the Sterling Hill zinc deposit, Ogdensburg, Sussex County, New Jersey: Society of Eco-nomic Geologists Guidebook Series, v. 35, p. 75-88. Miller, R.L., 1937, Stratigraphy of the Jacksonburg Limestone: Geological Society of America Bulletin, v. 48, p. 1687-1717. Monteverde, D.H., and Herman, G.C., 1989, Lower Paleozoic environments of deposition and the discontinuous sedimentary deposits atop the Middle Ordovician unconformity in New Jersey, *in* Grossman, I.G., ed., Paleozoic geology of the Kittatinny valley and southwest Highlands area, New Jersey: Geological Association of New Jersey, 6th annual field conference, p. 95-120. Nason, F.L., 1891, The Post-Archaen age of the white limestone of Sussex County, New Jersey: New Jersey Geological Survey, Annual Report of the State Geologist for 1890, p. 25-50. Offield, T.W., 1967, Bedrock geology of the Goshen-Greenwood Lake area, New York: New York State Museum and Science Service Map and Chart Series, no. 9, 78 p. Palmer, A.R., and Rozanov, A.Y., 1967, Archaeocyatha from New Jersey: Evidence for an intra-formational unconformity in the north-central Appalachians: Geology, v. 4, p. 773-774. Parris, D.C., and Cruikshank, K.M., 1992, Graptolite biostratigraphy of the Ordovician Martinsburg Formation in New Jersey and contiguous areas: New Jersey Geological Survey, Geological Survey Report 28, 18 p. Parris, D.C., Miller, L.F., and Dalton, R., 2001, Biostratigraphic determination of the basal Martinsburg Formation in the Delaware Water Gap Region, in Guidebook for the 66th Annual Field Conference of Pennsylvania Geologists: Shawnee-on-Delaware, Pa., p. 68-71. Peck, W.H., Volkert, R.A., Meredith, M.T., and Rader, E.L., 2006, Calcite-graphite thermometry of the Franklin Marble, New Jersey Highlands: Journal of Geology, v. 114, p. 485-499. Riva, J., 1969, Middle and Upper Ordovician graptolite faunas of St. Lawrence Lowlands of Quebec, and of Anticosti Island, in Kay, Marshall, ed., North Atlantic geology and continental drift: American Association of Petroleum Geologists

Memoir 12, p. 513- 556 _, 1974, A revision of some Ordovician graptolites of eastern North America: Paleontology, v. 17, p. 1-40. Sims, P.K., and Leonard, B.F., 1952, Geology of the Andover mining district, Sussex County, New Jersey: State of New Jersey Department of Conservation and Economic Development, Bulletin 62, 46 p. Spencer, A.C., Kummel, H.B., Salisbury, R.D., Wolff, J.E., and Palache, Charles, 1908, Description of the Franklin Furnace quadrangle, New Jersey: U.S. Geological Survey Atlas Folio 161, 27 p., scale 1:62,500. Sweet, W.C., and Bergstrom, S.M., 1986, Conodonts and biostratigraphic correlation: Annual Review of Earth and Planetary Science, v. 14, p. 85-112. Volkert, R.A., 1996, Geologic and engineering characteristics of Middle Proterozoic rocks of the Highlands, northern New Jersey, *in* Engineering geology in the metropolitan environment: Field Guide and Proceedings of the 39th Annual

Meeting of the Association of Engineering Geologists, p. A1-A33. , 2004, Mesoproterozoic rocks of the New Jersey Highlands, north-central Appalachians: petrogenesis and tectonic history in Tollo. R.P.. Corriveau. L.. McLelland, J., and Bartholomew, J., eds., Proterozoic tectonic evolution of the Grenville orogen in North America: Geological Society of America Memoir 197, p. 697-728. Volkert, R.A., Aleinikoff, J.N., and Fanning, C.M., 2010a, Tectonic, magmatic, and metamorphic history of the New Jersey Highlands: New insights from SHRIMP U-Pb geochronology, *in* Tollo, R.P., Bartholomew, M.J., Hibbard, J.P., and Karabinos, P.M., eds., From Rodinia to Pangea: The Lithotectonic Record of the Appalachian Region: Geological Society of America Memoir 206, p. 307-346. Volkert, R.A., and Drake, A.A., Jr., 1998, The Vernon Supersuite: Mesoproterozoic A-type granitoid rocks in the New Jersey Highlands: Northeastern Geology and Environmental Sciences, v. 20, p. 39-43. 1999, Geochemistry and stratigraphic relations of Middle Proterozoic rocks of the New Jersey Highlands, in Drake, A.A., Jr., ed., Geologic Studies in New Jersey and eastern Pennsylvania: U.S. Geological Survey Professional Paper 1565C, 77 p. __, 2010, Deep drilling at Limecrest quarry, Sparta, New Jersey: The Picking Table, v. 51, no. 1, p. 10-13. Volkert, R.A., Monteverde, D.H., and Drake, A.A., Jr., 1989, Bedrock geologic map of the Stanhope quadrangle. Suss

and Morris Counties, New Jersey: U.S. Geological Survey Geologic Quadrangle Map GQ-1671, scale 1:24,000. Volkert, R.A., Monteverde, D.H., Gates, A.E., Friehauf, K.C., Dalton, R.F., and Smith, R.C., II, 2010b, Geochemistry and origin of Neoproterozoic ironstone deposits in the New Jersey Highlands and implications for the lapetan rifted margin in the north-central Appalachians, *in* Tollo, R.P., Bartholomew, M.J., Hibbard, J.P., and Karabinos, P.M., From Rodinia to Pangea: The Lithotectonic Record of the Appalachian Region: Geological Society of America Memoir 206, p. 283-306 Volkert, R.A., and Peck, W. H., 2017, Constraints from geochemistry and oxygen isotopes for the hydrothermal origin of orthoamphibole mafic gneiss in the New Jersey Highlands, north-central Appalachians, USA: Lithos, v. 294-295, p. 184-197. Volkert, R.A., and Puffer. J.H., 1995, Late Proterozoic diabase dikes of the New Jersey Highlands - A remnant of lapetan rifting in the north-central Appalachians: U.S. Geological Survey Professional Paper 1565-A, 22 p. Volkert, R.A., Zartman, R.E., and Moore, P.B., 2005, U-Pb zircon geochronology of Mesoproterozoic postorogenic rocks and implications for post-Ottawan magmatism and metallogenesis, New Jersey Highlands and contiguous areas, USA: Precambrian Research, v. 139, p. 1-19. Weller, Stuart, 1903, The Paleozoic faunas: New Jersey Geological Survey, Report on Paleontology, v. 3, 462 p. Wherry, E.T., 1909, The early Paleozoic of the Lehigh Valley district, Pennsylvania: Science, new series, v. 30, 416 p. Witte, R.W., and Monteverde, D.H., 2006, Quaternary geology and geologic material resources of Newton East quadrangle, Sussex County, New Jersey: New Jersey Geological Survey, Open-File Map OFM 56, scale 1:24,000.

Wolff, J.E., and Brooks, A.H., 1898, The age of the Franklin white limestone of Sussex County, New Jersey: U.S. Geological Survey 18th Annual Report, pt. 2, p. 425-457. Zartman, R.E., Brock, M.R., Heyl, A.V., and Thomas, H.H., 1967, K-Ar and Rb-Sr ages of some alkalic intrusive rocks from the central and eastern United States: American Journal of Science, v. 265, p. 848-870.

- EXPLANATION OF MAP SYMBOLS Contact - Dashed where approximately located; dotted where concealed
- Faults Dashed where approximately located; dotted where concealed.
- Normal fault U, upthrown side; D, downthrown side
- Inclined thrust fault teeth on upper plate. FOLDS

Folds in Paleozoic rocks showing trace of axial surface, direction and dip of limbs, and direction of plunge. Folds in bedding and/or cleavage. Dotted where concealed.

- Syncline Anticline
- Folds in Proterozoic rocks showing trace of axial surface, direction and dip of limbs, and direction of plunge. Dotted where concealed.
- Synforn Overturned synform Overturned antiform **PLANAR FEATURES**
- Strike and dip of beds
- Inclined
- ²⁰ Strike and dip of cleavage in Paleozoic rocks Strike and dip of crystallization foliation
- Inclined
- Vertical -
- LINEAR FEATURES $\xrightarrow{18}$ Bearing and plunge of intersection of bedding and cleavage
- **OTHER FEATURES**

---- Form lines showing foliation in Proterozoic rocks in cross section

- Drillhol DR2
- Relative motion along faults in cross-section
- Abandoned mine, noted in 2022
- Abandoned quarry, noted in 2022

