

This compiled geologic map, partially supported by the U.S. Geological Survey (USGS), National Cooperative Geologic Mapping Program under STATEMAP marks year-4 of a multi-year project to compile the entire bedrock portion of the Henderson 30'x 60' Quadrangle (Henderson 100K) and the western 4- 1:24K quadrangles of the Roanoke Rapids 30'x 60' Quadrangle (Roanoke Rapids 100K) in support of the USGS US Geoframework Initiative's (USGI) vision for a nation-wide, seamless geologic map. The goal of this compilation effort was to produce a new 1:100,000-scale digital geologic map of the study area using the USGS Geologic Mapping Schema (GeMS). When available, geologic data at scales more detailed the 1:100,000-scale were used (i.e. 1:24,000-scale data). Data from the more detailed maps were preserved at the scale originally mapped. As such some map unit polygons are very small on this 100,000-scale map and are unlabeled. The unit name of the unlabeled polygon can usually be interpreted from nearby labeled polygons. The GeMS digital database should be utilized in conjunction with this

As part of the compilation effort, the line work from multiple legacy sources (see index of workers) were utilized and adjusted or modified according to new field observations and/or edge-matched with adjacent quadrangles in the Henderson 100K and with the South Boston 100K (Horton et al., 2022a and 2022b). Some contacts could not be edge-matched with the South Boston 100K as some edge-match issues persist. Additional compilation work in the southern portion of the South Boston 100K is needed to create a seamless transition from the South Boston 100K. See accompanying pamphlet for detailed unit descriptions and additional information.

Bechtel, R., Stoddard E.F., Clark, T.W., Beaudoin, A.P., Gilliam, C., and Antczak, G., 2010, Bedrock geologic map of the Louisburg 7.5-minute Quadrangle, Franklin County, North Carolina: North Carolina Blake, D.E., 1986, The geology of the Grissom area, Franklin, Granville, and Wake Counties, North Carolina: A structural and metamorphic analysis, [M.S. thesis], Raleigh, North Carolina State University, 300 p. Blake, D.E., 2005, Geologic map of the southeast portion of the Townsville 7.5-minute Quadrangle, Vance County, North Carolina: North Carolina Geological Survey Open-file Report 2005-06, scale 1:24,000, in Blake, D.E., Schronce, A.G., Smith, B.C. and Kendall, J.M., 2009, Geologic map of the Stem 7.5-minute Quadrangle, Granville County, North Carolina: North Carolina Geological Survey Open-file Report Blake, D.E., Stoddard, E.F., Rhodes, D.L., and Morrow, R.H., 2015, Bedrock geologic map of the Essex 7.5-minute Quadrangle, Nash, Halifax and Warren counties, North Carolina: North Carolina Geological Blake, D.E., Phillips, C.M., Grosser, B.D., Robitaille, K.R. and Witanachchi, C., 2016, Geologic map of the Grissom 7.5-minute Quadrangle, Granville, Franklin and Wake counties, North Carolina: North Carolina Geological Survey Open-file Report 2016-20, scale 1:24,000, in color.

Blake, D.E., Robitaille, K.R., Phillips, C., Witanachchi, C., Wooten, R.M., Grimes, W., Pesicek, J.D., and Grosser, B.D., 2016, Compiled geologic map of the Wilton 7.5-minute Quadrangle, Granville, Vance and Franklin counties, North Carolina: North Carolina Geological Survey Open-file Report 2016-21, scale 1:24,000, in color. Blake, D.E., and Stoddard, E.F., 2016, Geologic map of the Henderson 7.5-minute Quadrangle, Vance County, North Carolina: North Carolina Geological Survey Open-file Report 2016-17, scale 1:24,000, in Blake, D.E., Rice, K.A., Finnerty, P.C., and Nolan, J.T., 2020, Bedrock geologic map of the Warrenton 7.5-minute Quadrangle, Warren County, North Carolina: North Carolina Geological Survey Open-file Report Blake, D.E., *Rice, A.K., Finnerty, P.C., Nolan, J.T., Peach, B.T., Morrow, R.H., IV, LaMaskin, T.A., and Haproff, P.J., 2021, Southern Appalachian hinterland freeway system before the I-85 and I-95 corridors: The Eastern Piedmont fault system and lithotectonic terranes in North Carolina: Geological Society of America Abstracts with Programs, vol. 53, no. 2, doi: 10.1130/abs/2021SE-362333 Blake, D.E., Futrell, J.L., LaMaskin, T.A., and Fishel, E.R., 2024, Detrital zircon ages for metavolcaniclastic sedimentary rocks of the Spring Hope terrane, North Carolina eastern Piedmont: Geological Society of America Abstracts with Programs, v. 56, no. 2, doi: 10.1130/abs/2024SE-398400 30ltin, W.R. 1985, Geology of the Hollister 7 1/2-minute quadrangle, Warren and Halifax counties, North Carolina: Metamorphic transition in the Eastern slate belt: [M.S. thesis], North Carolina State University,

Bowman, J.D., 2010, The Aaron Formation: Evidence for a new lithotectonic unit in Carolinia, north central North Carolina [MS thesis]: North Carolina State University, Raleigh, North Carolina, 112 p. Bradley, P.J., Phillips, C.M., Witanachchi, C., Ward, A.N., and Clark, T.W., 2004, Geologic map of the Northwest Durham 7.5-minute Quadrangle, Durham and Orange counties, North Carolina: North Carolina Geological Survey Open-file Report 2004-03a Revision-01 (2010), scale 1:24,000, in color. Bradley, P.J., Hanna, H.D. and Bechtel, R, 2011, Geologic map of the Rougemont 7.5-minute Quadrangle, Orange, Durham and Person counties, North Carolina: North Carolina Geological Survey Open-file Bradley, P.J., and Miller, B.V., 2011, New geologic mapping and age constraints in the Hyco Arc of the Carolina terrane in Orange County, North Carolina: Geological Society of America Abstracts with Programs,

Briggs, D.F., Gilbert, M.C., and Glover, L.G. III, 1978, Petrology and regional significance of the Roxboro Metagranite, North Carolina, Geological Society of America Bulletin, v. 89, p. 511-521. Burgess, J., Blake, D.E., and Viete, D., 2024, New approaches to discern the timing of the metamorphic history of the Horse Creek Schist, North Carolina eastern Piedmont: Geological Society of America Abstracts with Programs, v. 56, no. 2, doi: 10.1130/abs/2024SE-397991. Carter, M.W., Holm-Denoma, C., McAleer, R.J., Powell, N., Vazquez, J., Deasy, R.T., Merschat, A. Blake, D.E., Futrell, J.L., and Fishel, E.R., 2024, Augmenting geologic mapping and terrane characterization with new geochronology from the eastern Piedmont in southeastern Virginia and northeastern North Carolina: Geological Society of America Abstracts with Programs, v. 56, no. 2, doi: 10.1130/

Briggs, D.F., 1974, Petrology of the Roxboro metagranite, North Carolina, [M.S. thesis]: Blacksburg, Virginia Polytechnic Institute and State University, 88 p.

Caslin, L.A., 2001, Age and significance of the Falls Leucogneiss, Wake County, North Carolina [M.S. thesis]: Raleigh, North Carolina State University, 39 p. Clark, T.W., Phillips, C.M., and Blake, D.E., 2016, Geologic map of the Creedmoor 7.5-minute Quadrangle, Granville, Wake and Durham counties, North Carolina: North Carolina Geological Survey Open-file Report 2016-18, scale 1:24,000, in color. Coler, D.G., and Samson, S.D., 2000, Characterization of the Spring Hope and Roanoke Rapids terranes, Southern Appalachians: A U -P b geochronologic and Nd isotopic study: Geological Society of America

Abstracts with Programs, v. 32, No. 1, p. 11-12. Dorfler, K.M., Tracy, R.J., Buchwaldt, R., and Owens, B.E., 2009, Evidence for Ordovician-Silurian low-pressure regional metamorphism overprinted by an Alleghanian-age contact event, southeastern Virginia Piedmont: Geological Society of America, Abstracts with Program, v. 41, p. 635. Espenshade, G.S., and Potter, D.B., 1960, Kyanite, sillimanite, and andalusite deposits of the southeastern states: USGS Prof. Paper 336, 121 p. Finnerty, P.C., 2020, A lithotectonic evaluation of the eastern Raleigh terrane in the northern Macon Quadrangle, North Carolina eastern Piedmont [M.S. thesis]: Wilmington, University of North Carolina at

Finnerty, P.C., Nolan, J.T., Rice, A.K., Peach, B.T., LaMaskin, T., and Blake, D.E., 2021, Hard to judge a rock by its cover: New perspectives on the eastern Raleigh terrane in the North Carolina eastern Piedmont: Geological Society of America Abstracts with Programs, v. 53, no. 2, doi: 10.1130/abs/2021SE-362159. Fishel, E.R., Futrell, J.L., Blake, D.E., and LaMaskin, T.A., 2024, New whole rock major- and trace-element geochemisty and Sm-Nd isotopic compositions from the "Greater Raleigh terrane": revisiting the Warren terrane, Geological Society of America Abstracts with Programs. Vol. 56, No. 2, 2024. Fuemmeler, S., 2004, Geologic map of the [northern half of the] Gold Sand 7.5-minute quadrangle, Franklin and Warren Counties, North Carolina [scale 1:24,000], North Carolina Geological Survey manuscript Fullagar, P.D., and Butler, J. R., 1979, 325 to 265 m.y. old granitic plutons in the Piedmont of the southeastern Appalachians: American Journal of Science, v. 279, p. 161-185.

Goldberg, S. A., 1994, U-Pb geochronology of volcanogenic terranes of the eastern North Carolina Piedmont: Preliminary results, in Stoddard, E. F., and Blake, D. E., eds, Geology and field Trip Guide, Western Flank of the Raleigh Metamorphic Belt, North Carolina, Carolina Geological Society Field Trip Guidebook, p. 13-17. Gottfried, D., Froelich, A.J. and Grossman, J.N., 1991: Geochemical Data for Jurassic Diabase Associated with Early Mesozoic Basins in the Eastern United States: Durham and Sanford Basins, North Carolina, USGS Open File Report 91-322-I, plate 1 of 1, scale 1:125,000. Grimes, W. S., 2000, The Geology of the Kittrell area in southern Vance County, North Carolina, [M.S. thesis], Raleigh, North Carolina State University, 72 p.

Glover, L., and Sinha, A., 1973, The Virgilina deformation, a late Precambrian to Early Cambrian (?) orogenic event in the central Piedmont of Virginia and North Carolina, American Journal of Science, Cooper v.

Hadley, J.B., 1974, Geologic map of the Oxford Quadrangle, Granville and Vance counties, North Carolina: U.S. Geological Survey, Miscellaneous Field Studies Map MF-608, scale 1:62,500. Hibbard, J.P., 2017, Compiled geologic map of the Hyco shear zone and adjacent portions of the Cluster Springs and Roxboro 7.5-minute quadrangles, Person County, North Carolina: North Carolina Geological Survey Open-file Report 2017-16, scale 1:24,000, in color. Horton, J.W., Jr., and Stern, T.W., 1994, Tectonic significance of preliminary uranium-lead ages from the eastern Piedmont of North Carolina: Geological Society of America Abstracts with Programs, v. 26, p. 21. Horton, J.W., Jr., Peper, J.D., Burton, W.C., Weems, R.E., and Sacks, P.E., 2022a, Geologic map of the South Boston 30' × 60' Quadrangle, Virginia and North Carolina: U.S. Geological Survey Scientific

Horton, J.W., Jr., Peper, J.D., Burton, W.C., Weems, R.E., Sacks, P.E., and Crider, E.A., Jr., 2022b, Database for the geologic map of the South Boston 30' × 60' Quadrangle, Virginia and North Carolina: U.S. Geological Survey data release, https://doi.org/10.5066/P98AQDR7. Hughes, E.H., 1985, The hydrothermal alteration system at Daniels Mountain, northern Carolina slate belt, North Carolina: [M.S. thesis], Chapel Hill, University of North Carolina at Chapel Hill, 86 p. Kite, L. E., 1982, The Halifax County complex: Oceanic lithosphere in the northeastern Piedmont, North Carolina: [M.S. thesis], North Carolina State University, Raleigh, North Carolina, 102 p. Kite, L. E., and E. F. Stoddard, 1984, The Halifax County complex: Oceanic lithosphere in the eastern North Carolina Piedmont: Geological Society of America Bulletin, v. 95, p. 422-432. LaMaskin, T., Nolan, J.T., Finnerty, P.C., Peach, B.P., and Blake, D.E., 2021, Zircon U-Pb geochronology of the eastern Raleigh terrane in the North Carolina eastern Piedmont: Geological Society of America Abstracts with Programs, v. 53, no. 2. **LeHuray, A.P., 1989,** U-Pb and Th-Pb whole rock studies in the southern Appalachian Piedmont: Southeastern Geology, v. 30, p. 77–94.

Investigations Map 3483, 1 sheet, scale 1:100,000, 46-p. pamphlet, https://doi.org/10.3133/sim3483.

Lesure, F.G., 1993, Geochemistry in the southern part of the Virgilina District, North Carolina and Virginia, US Geological Survey, Miscellaneous Field Studies Map 2203, scale 1:48,000. McConnell, K.I., 1974, Geology of the late Precambrian Flat River Complex and associated volcanic rocks near, Durham, North Carolina, [M.S. thesis], Blacksburg, Virginia Polytechnic and State University, 64 p. McConnell, K.I. and Glover, L., 1982, Age and emplacement of the Flat River complex, an Eocambrian sub-volcanic pluton near Durham, North Carolina: Geological Society of America Special Paper 191, p. Morrow, R.M., IV., 2015, The Macon fault: A folded dextral shear strand of the eastern Piedmont fault system [M.S. thesis]: Wilmington, University of North Carolina Wilmington, 117 p.

Morrow, R.H., Stoddard, E.F., Blake, D.E., 2016, Geologic map of the Inez 7.5-minute Quadrangle, Warren County, North Carolina: North Carolina Geological Survey Open-file Report 2016-12, scale 1:24,000, in

Nolan, J.T., 2020, Evaluating petrologic, structural, and geochronologic relationships of the eastern Raleigh terrane in the western Afton Quadrangle, North Carolina [M.S. thesis]: Wilmington, University of North Owens, B.E. and Wilson, S.E., 2009, Geochemical constraints on the origin of chloritoid-bearing kyanite quartzite at Hagers Mountain, North Carolina: Southeastern Geology, v. 46, no. 3, p. 135-153. Owens, B.E., and Hamilton, M.A., 2018, A review of U-Pb zircon ages from the Roanoke Rapids terrane, eastern Piedmont province, Virginia, and new Nd isotopic data bearing on the nature of cratonic basement: Geological Society of America Abstracts with Programs, v. 50, no. 6, p. 192. Parker, J.M., 1963, Geologic setting of the Hamme tungsten district, North Carolina and Virginia, US Geological Survey, Bulletin 1122-G, scale 1:48,000.

Parnell, D.B., 2012, Lithodemic, structural, and geochemical characterization of the northeastern Carolina terrane in the northern Oxford 7.5-minute Quadrangle, North Carolina, [M.S. thesis], Wilmington, University of North Carolina Wilmington, 179 p. Parnell, D.B.; Blake, D.E.; Wooten, R.M.; Phillips, C.M.; and Farris, P.F., 2016, Compiled geologic map of the Oxford 7.5-minute Quadrangle, Granville and Vance counties, North Carolina: North Carolina Geological Survey Open-file Report 2016-19, scale 1:24,000, in color. Peach, B.T., 2018, Lithodemic, geochronologic, and structural evaluation of the Raleigh terrane in the North Carolina eastern Piedmont [M.S. thesis]: Wilmington, University of North Carolina Wilmington, 200 p. Phillips, C.M., Witanachchi, C., Ward, A.N., and Clark, T.W., 2004, Geologic map of the Northeast Durham 7.5-minute Quadrangle, Durham, Granville, and Wake counties, North Carolina: North Carolina Geological Survey Open-file Report 2004-03a Revision-01 (2010), scale 1:24,000, in color. Pollock, J.C., Hibbard, J.P., and Sylvester, P.J., 2010, Depositional and tectonic setting of the Neoproterozoic-early Paleozoic rocks of the Virgilina sequence and Albemarle Group, North Carolina: 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. 739-772. Rice, A.K., 2021, A lithodemic, lithologic and structural analysis of the eastern Raleigh terrane in the southern Macon Quadrangle, North Carolina, [M.S. thesis]: Wilmington, University of North Carolina

Rhodes, D.L., Blake, D.E., Morrow, R.H., April, J.D., Gross, A.L., Kendall, J.M., and Greene, G.M., 2012, Geologic map of the eastern and central portions of the Lake Michie 7.5-minute Quadrangle, Durham, Granville and Person counties, North Carolina: North Carolina Geological Survey, Open-file Report 2012-01, scale 1:24,000, in color. Rhodes, D.L., 2013, Lithologic and structural relationships of northeastern Carolina terrane in the Lake Michie 1:24K Quadrangle, North Carolina, [M.S. thesis], Wilmington, University of North Carolina Robitaille, K.R., 2004, Geology and terrane relationships of the Tar River area, Franklin and Granville counties, North Carolina, [M.S. thesis], Wilmington, University of North Carolina Wilmington, 167 p. Russell, G.S., Russell, C.W., Speer, J.A., and Glover, L., III, 1981, Rb-Sr evidence of latest Precambrian to Cambrian and Alleghanian plutonism along the eastern margin of the sub-Coastal Plain Appalachians, North Carolina and Virginia: Geological Society of America Abstract with Programs, v. 13, p. 543. Sacks, P.E., Boltin, W.R., and Stoddard E.F, 2011, Bedrock geologic map of the Hollister 7.5-minute Quadrangle, Halifax and Warren counties, North Carolina: North Carolina Geological Survey Open-file Report

Samson, S.D., Secor, D.T., and Hamilton, M.A., 2001, Wandering Carolina: tracking exotic terranes with detrital zircons: Geological Society of America Abstract with Programs, v. 33, no. 2, p. A-263. Schneider, D., and Samson, S. D., 2001, A comparison of zircon and monazite U-Pb ages from the Rolesville Batholith, NC; lessons from misbehaving minerals: Geological Society of America Abstracts with Speer, J. A., 1994, Nature of the Rolesville Batholith, North Carolina, in Stoddard, E. F., and Blake, D. E., eds, Geology and field Trip Guide, Western Flank of the Raleigh Metamorphic Belt, North Carolina, Stoddard, E.F., Fuemmeler, S., Bechtel, R., Clark, T. W., and Sprinkle II, D. P., 2009, Preliminary bedrock geologic map of the Gold Sand, Centerville, Castalia, and Justice 7.5-minute quadrangles, Franklin, Nash, Warren and Halifax counties, North Carolina: North Carolina Geological Survey Open-file Report 2009-03, scale 1:24,000, in color.

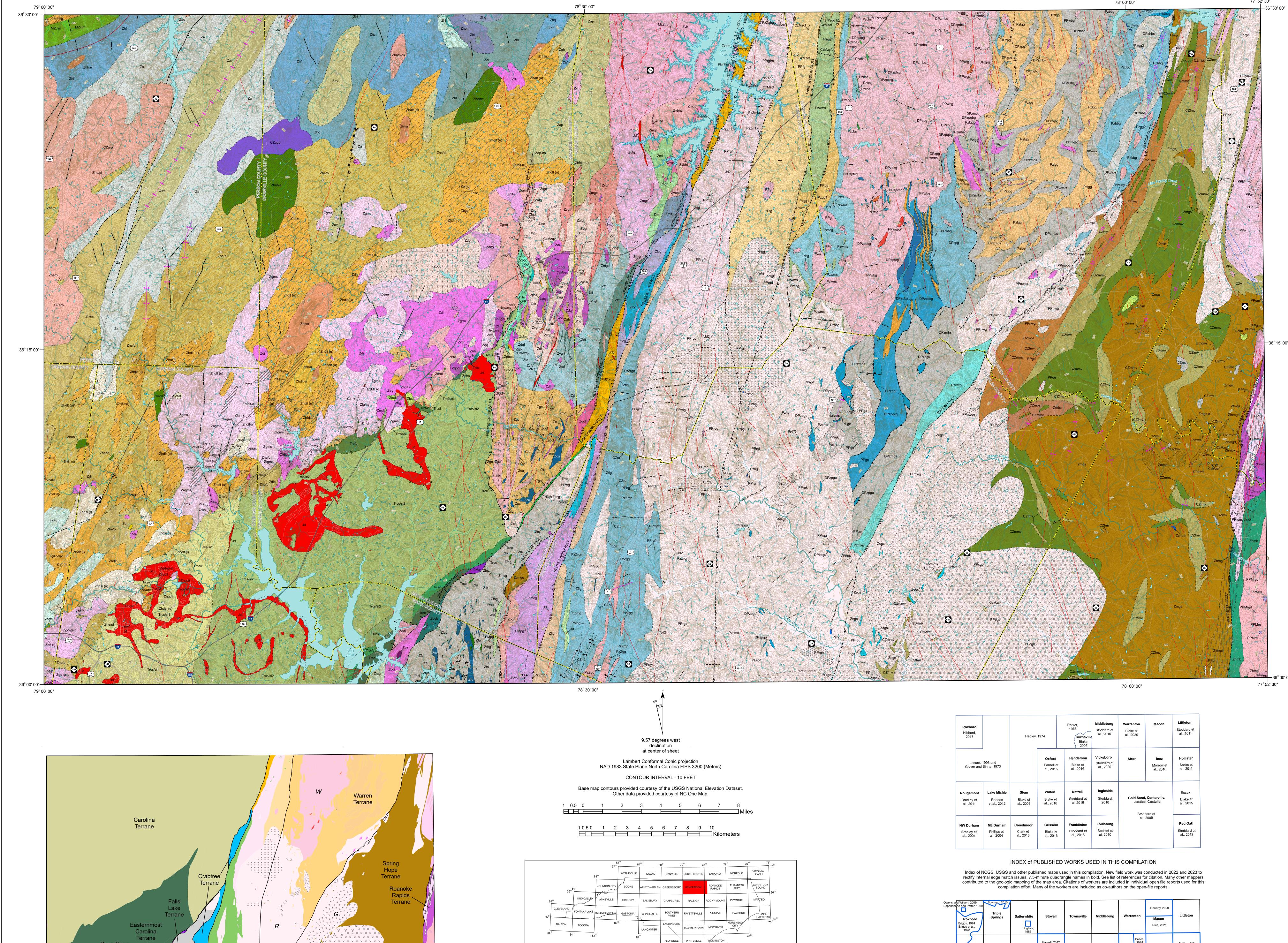
Stoddard, E.F., 2010, Bedrock geologic map of the Ingleside 7.5-minute Quadrangle, Franklin and Vance counties, North Carolina: North Carolina Geological Survey Open-file Report 2010-05, scale 1:24,000, in Stoddard E.F., Sacks, P.E., Clark, T.W. and Bechtel, R., 2011, Bedrock geologic map of the Littleton 7.5-minute Quadrangle, Warren and Halifax counties, North Carolina: North Carolina Geological Survey Stoddard. E. F., and B. V. Miller, 2011, The Spring Hope terrane: Lithostratigraphy and new age constraints: Geological Society of America Abstracts with Programs, v. 43, No. 2, p. 31. Stoddard E.F., Bechtel, R., Sacks, P.E., and Kite-Price, L., 2012, Bedrock geologic map of the Red Oak 7.5-minute Quadrangle, Nash County, North Carolina: North Carolina Geological Survey Open-file Report

Stoddard, E.F., Blake, D.E., and Buford, C.L., 2016, Geologic map of the Middleburg 7.5-minute Quadrangle, Vance and Warren counties, North Carolina: North Carolina Geological Survey Open-file Report Stoddard, E.F., Grimes, W.S., Blake, D.E. and Robitaille, K.R., 2016, Geologic map of the Kittrell 7.5-minute Quadrangle, Vance, Franklin and Granville counties, North Carolina: North Carolina Geological Stoddard, E.F., Phillips, C.M., Witanachchi, C.D., Ward, A.M., Farris, P.F., Blake, D.E., and Clark, T.W., 2016, Geologic map of the Franklinton 7.5-minute Quadrangle, Franklin and Wake counties, North Carolina: North Carolina Geological Survey Open-file Report 2016-16, scale 1:24,000, in color. Stoddard, E.F. and Bechtel, R., 2020, Bedrock geologic map of the Vicksboro 7.5-minute Quadrangle, Warren and Vance counties, North Carolina: North Carolina Geological Survey Open-file Report 2020-02, in

Wedemeyer, R.G., and Spruill, R.K., 1980, Geochemistry and geochronology of the Sims granite, Eastern slate belt, North Carolina: Geological Society of America Abstract with Programs, v. 12, p. 211. Wortman, G.L., Samson, S.D., and Hibbard, J.P., 2000, Precise U-Pb zircon constraints on the earliest magmatic history of the Carolina terrane, Journal of Geology, v. 108, p. 321-338. Wright, J.E., 1974, Geology of the Carolina slate belt in the vicinity of Durham, North Carolina, [M.S. thesis], Blacksburg, Virginia Polytechnic Institute and State University, 78 p.

New geologic data collected in July 2022 to June 2023 as part of this compilation work in the western portion of the project area. Extensive GIS compilation work in 2024. This map and explanatory information is submitted for publication with the understanding that the United States Government is authorized to reproduce and distribute reprints for governmental use. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. Base map contours provided courtesy of the USGS National Elevation Dataset. Other data provided courtesy of NC One Map.

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INDEX TO TERRANES

Major Mississippian to Permian age intrusive rock bodies designated by letters: R, Rolesville Batholith; W, Wise pluton; G, Gupton pluton; C, Castalia pluton

William E. Toby Vinson, Jr., Director

Dwain M. Veach, State Geologist and Section Chief, NC Geological Survey

Compiled bedrock geologic map of the Henderson and western portion of the Roanoke Rapids 30' x 60' quadrangles, North Carolina

Moriah

Lake Michie

Durham

Durham

Gold Sand

Justice

Index of EDMAP projects, student theses, other published and unpublished works utilized in this compilation.

Red Oak

By: David E. Blake, Edward F. Stoddard, Philip J. Bradley and Katherine E. Pelt Cartographic representation by Katherine E. Pelt, Michael A. Medina, Heather D. Hanna, and Philip J. Bradley

2025

(Version 12/11/2025)