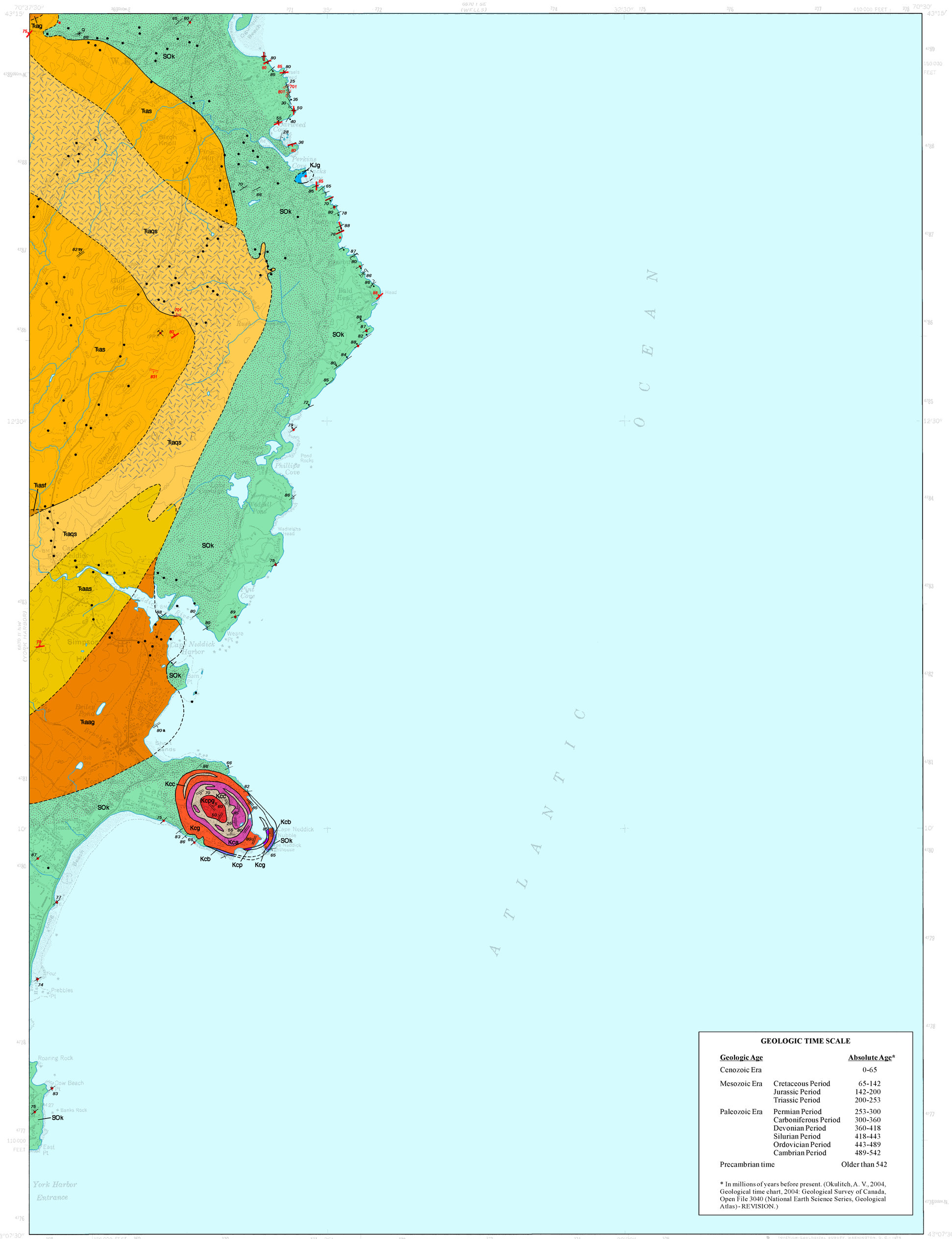

GEOLOGIC TIME SCALE

Geologic Age		Absolute Age*
Cenozoic Era		0-65
Mesozoic Era	Cretaceous Period	65-142
	Jurassic Period	142-200
	Triassic Period	200-253
Paleozoic Era	Permian Period	253-300
	Carboniferous Period	300-360
	Devonian Period	360-418
	Silurian Period	418-443
	Ordovician Period	443-489
	Cambrian Period	489-542
Precambrian time		Older than 542

* In millions of years before present. (Okulitch, A. V., 2004, Geological time chart, 2004: Geological Survey of Canada, Open File 3040 (National Earth Science Series, Geological Atlas) - REVISION.)

EXPLANATION OF UNITS

INTRUSIVE ROCKS

Cretaceous

Younger Funnel

Kcpg **Poikilitic gabbro.** Gradational to **Kcc**.

Kcc **Cortlandtitic gabbro.** Dark gray mafic-rich gabbro with large poikilitic hornblende phenocrysts.

Older Funnel

Kca **Medium gray anorthositic gabbro.**

Kcg **Medium dark gray gabbro.** Commonly with thin lighter gray gabbro layers. Some layers are pegmatitic gabbro. Thin unit of breccia along south and east margins of the complex.

Kcp **Coarse-grained pegmatitic gabbro.**

Kcb **Volcanic breccia.**

Cape Neddick Complex

Cretaceous-Jurassic(?)

KJg **Gabbro at Jacks Cove.** Slightly rusty-weathering, dark gray, coarse-grained diabase, composed principally of plagioclase, augite, hornblende, biotite, and magnetite. Contains well-digested xenoliths. Swirled layering is present.

Triassic

Traag **Aegerine-bearing alkalic granite.** Buff to slightly salmon-colored, fine-grained to medium-grained granite containing euhedral to subhedral perthite, antiperthite, microcline, and quartz. Aegerine occurs as individual euhedral to subhedral grains, and also in mineral clumps associated with arfvedsonite, fluorite, and calcite. Locally contains miarolitic cavities, or xenoliths of Kittery Formation. Aegirine granite also occurs within the quartz syenite unit (**Traqs**).

Trag **Alkalic granite.** Light gray, fine-grained to medium-grained alkalic granite.

Tras **Alkalic syenite.** Brown to olive green, medium-grained to coarse-grained syenite containing microperthite, riebeckite, arfvedsonite, hastingsite, aegerine-augite, aegirine, and aenigmatite. Rock contains less than 2% quartz. Unit varies considerably. Complex textures are common.

Trasf Fine-grained variety. Alkalic syenite with trachytic texture and more ferromagnesian minerals. Present near southern edge of unit.

Traqs **Quartz syenite.** Similar to alkalic syenite (**Tas**), but containing 10 to 15% quartz. Texture and composition are variable. Blocks of syenite are cut by stringers of alkalic granite. May represent contamination of granite by assimilation of syenite blocks (Hussey, 1962).

Traas **Porphyritic aenigmatite syenite.** Dark to medium green syenite with phenocrysts of euhedral to subhedral perthitic potassium feldspar. Matrix contains medium-grained to fine-grained euhedral to subhedral aenigmatite, aegeirine-augite, and perthite; and subhedral to anhedral richterite, quartz, plagioclase, microcline, ilmenite, and magnetite.

Agamenticus Complex

STRATIFIED ROCKS

Merrimack Group

Silurian - Ordovician

SOk **Kittery Formation.** Variably thin to thick bedded, buff-weathering feldspathic and calcareous metawacke. Characterized by well-developed primary structures including graded bedding, channel cuts-and-fills, small scale cross-bedding, flame structure, and flute casts.

EXPLANATION OF SYMBOLS

Note: Structural symbols are drawn parallel to strike or trend of measured structural feature. Barb or tick indicates direction of dip, if known. Annotation gives dip or plunge angle. For planar features, symbol is centered at observation point. For linear features, tail of symbol is at observation point. Multiple measurements at a site are represented by combined symbols.

- Outcrop of mapped unit (small exposure, large area of exposure).
- Fine-grained to aphanitic dikes of mafic composition. Includes basalt and diabase (inclined, vertical, dip not given, orientation not given).
- Fine-grained to aphanitic dikes of felsic composition. Includes rhyolite and trachyte (inclined).
- Phaneritic dike. Composition indicated by letters: a = aegirine-bearing granite, sy = syenite (inclined).
- Bedding (upright, vertical with tops toward ball, overturned, tops unknown inclined, tops unknown vertical).
- Igneous compositional layering (inclined).
- Cleavage (inclined, vertical).
- Shear zone (vertical).
- Occurrence of abundant quartz veins.
- Rock quarry

EXPLANATION OF PATTERNS

- Hornfels or granofels, in contact metamorphic aureole near a pluton.
- Region with abundant xenoliths of alkalic syenite (schematic). (From Brooks, 1990)

EXPLANATION OF LINES

- Contact between mapped units. Interpreted to be of stratigraphic or intrusive origin. Location is constrained by bedrock outcrops indicated by symbols on the map, or inferred by projecting rock units from adjacent areas. Additional information may have been used. Solid line where well located. The location of some contacts is not well constrained.

REFERENCES

Brooks, J. A., 1990, The petrogenesis of the Agamenticus Complex and late Paleozoic and Mesozoic tectonics in New England: Ph.D. dissertation, University of New Hampshire, Durham, New Hampshire, 353 p.

Brooks, J. A., and others, 1989, The geology and geochemistry of the Agamenticus Complex, York, Maine, *in* Berry, A. W. (editor), Guidebook for field trips in southern and west-central Maine: New England Intercollegiate Geological Conference, University of Maine at Farmington, p. 1-24.

Hussey, A. M., II, 1962, The geology of southern York County, Maine: Maine Geological Survey, Bulletin 14, 67 p.

Hussey, A.M., II, 1965, Petrology, structure, and age relations of the igneous rocks of the York Beach area, Maine, *in* Hussey, A.M., II (editor), Guidebook to field trips in southern Maine: New England Intercollegiate Geological Conference, Bowdoin College, Brunswick, Maine, Trip G, p. 73-83.

Hussey, A. M., II, 1985, The bedrock geology of the Bath and Portland 2-degree map sheets, Maine: Maine Geological Survey, Open-File Report 85-87, 82 p. (2 maps, scale 1:250,000).

Hussey, A.M., II, and Brooks, J.A., 2014, Bedrock geology of the York Harbor quadrangle, Maine: Maine Geological Survey, Progress Map 14-1, scale 1:24,000.

Hussey, A. M., II, and others, 2008, Bedrock geology of the Kittery 1:100,000 quadrangle, Maine and New Hampshire: Maine Geological Survey, Geologic Map 08-78, scale 1:100,000.

Wandke, A., 1922, Intrusive rocks of the Portsmouth Basin, Maine and New Hampshire: American Journal of Science, 5th series, v. 4, p. 139-158.

Bedrock Geology of the York Beach Quadrangle, Maine

Bedrock geologic mapping by
Arthur M. Hussey II
John A. Brooks

Digital cartography by
Susan S. Tolman

Geologic editing by
Henry N. Berry IV

Robert G. Marvinney
State Geologist

Cartographic design and editing by
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U.S. Geological Survey STATEMAP Program, Cooperative Agreement No. 03HQAG0068.

Maine Geological Survey

Address: 93 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 **E-mail:** mgs@maine.gov
Home page: http://www.maine.gov/dacf/mgs/

Progress Map 14-2
2014

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Quadrangle Location

SOURCES OF INFORMATION

Field work by A. M. Hussey II, 1970-2003; published mapping by Wandke (1922), Hussey (1962), and Brooks (1990).

Topographic base from U.S. Geological Survey York Beach quadrangle, scale 1:24,000, using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

AGE OF THE AGAMENTICUS COMPLEX

The Triassic age for the Agamenticus Complex is based on a potassium-argon (K-Ar) biotite age of 233 ± 5 Ma obtained from a sample in the York Harbor quadrangle. For details, please see the York Harbor bedrock geologic map (Hussey and Brooks, 2014).