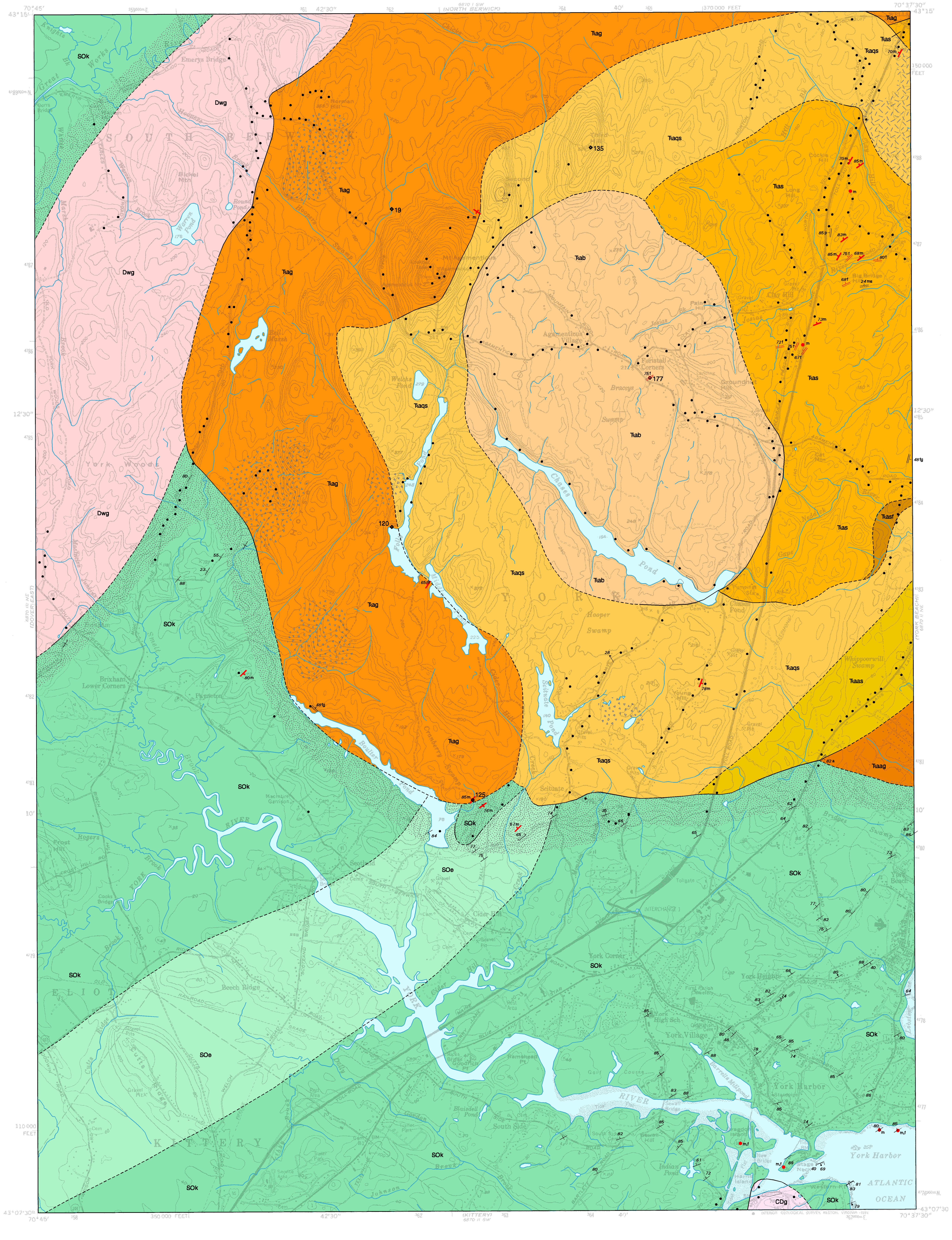

Bedrock Geology of the York Harbor Quadrangle, Maine

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

Digital cartography by
Susan S. Tolman

Geologic editing by
Henry N. Berry IV

Cartographic design and editing by
Robert D. Tucker

Robert G. Marvinney
State Geologist

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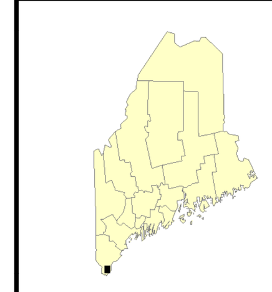
Maine Geological Survey

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 14-1
2014



Quadrangle Location

TRUE NORTH

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

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 Harbor 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.

EXPLANATION OF UNITS

INTRUSIVE ROCKS

Triassic

Agamenticus Complex

Ŧab — **Biotite granite.** Fine-grained to medium-grained, light pinkish-gray, porphyritic biotite ± amphibole granite. Phenocrysts range from 10 to 60 % of the rock.

Ŧaag — **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 (**Ŧaqs**).

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

Ŧas — **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.

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

Ŧaqs — **Quartz syenite.** Similar to alkalic syenite (**Ŧas**), 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).

Ŧaas — **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.

Carboniferous - Devonian(?)

CDg — **Granite and pegmatite.** Biotite-muscovite granite and pegmatite.

Devonian

Dwg — **Webhannet Pluton.** Light gray, medium-grained to coarse-grained, biotite granite with sphene and epidote.

STRATIFIED ROCKS

Silurian - Ordovician

Merrimack Group

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

SOe — **Eliot Formation.** Generally thin-bedded, medium gray, calcareous and ankeritic quartz-biotite-chlorite phyllite and metasiltstone, and dark gray biotite-chlorite-muscovite phyllite.

EXPLANATION OF PATTERNS

Region with abundant xenoliths of country rock (schematic). (From Brooks, 1990)

Region with abundant xenoliths of alkalic syenite (schematic). (From Brooks, 1990)

Hornfels or granofels, in contact metamorphic aureole of a pluton (schematic).

AGE OF THE AGAMENTICUS COMPLEX

An isotopic age was reported for sample BG-10-68 from the Agamenticus Complex by Foland and others (1971) using the potassium-argon (K-Ar) technique on biotite. That age was recalculated by Foland and Faul (1977) using a new 40-Ar spike calibration, and reported in their Table 1. Dalrymple (1979) presented a table of correction factors for K-Ar ages, based on new radioactive decay constants recommended by the IUGS subcommission on geochronology. The appropriate correction factor, F, for sample BG-10-68 is 1.0224. Applying this to the age presented by Foland and Faul gives a corrected age of 233 ± 5 Ma (with 1σ analytical uncertainty), corresponding to the Triassic Period. Foland and others assign the sample to unit "pbg" of Hussey (1962), pink porphyritic biotite granite, mapped here as **Ŧab**, which is the youngest intrusive phase of the Agamenticus Complex. While the sample description is consistent with this assignment, the latitude-longitude coordinate reported by Foland and others (1971) in their Appendix, unfortunately, plots in the region mapped as alkalic syenite (**Ŧas**), casting uncertainty on which unit of the Agamenticus Complex was actually dated. Because the rocks of the complex are closely related, we assume they have a similar age, and have assigned the whole complex to the Triassic.

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 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).

20 m, m, m — Fine-grained to aphanitic dikes of mafic composition. Includes basalt and diabase (inclined, vertical, orientation not given).

20 f, f — Fine-grained to aphanitic dikes of felsic composition. Includes rhyolite and trachyte (inclined, orientation not given).

20 — Phaneritic dike. Composition indicated by letters: a = aegirine-bearing granite, fg = fine-grained alkalic granite, ms = mafic syenite, and p = pegmatite (inclined).

20, 20, 20 — Bedding (upright, overturned, tops unknown inclined, tops unknown vertical).

20 — Cleavage (inclined).

20 — Mineral lineation (plunging).

19 — Location of sample analyzed for geochemistry by Brooks (1990). His sample number is given.

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. (See regional map by Hussey and others, 2008.) Additional information may have been used. Solid line where well located. The location of some contacts is not well constrained.

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