Bedrock Geology of the Northwestern Half of the Mount Waldo Quadrangle, Maine

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EXPLANATION OF UNITS

INTRUSIVE ROCKS

Devonian [D]

Dmw — **Mount Waldo Granite.** Medium gray, fine-grained to very fine-grained, porphyritic biotite ± amphibole granite. Feldspar phenocrysts commonly comprise 15 - 20% of the rock. They are commonly 0.5 x 2 centimeters (cm) in size, and locally up to 1.5 x 5.5 cm. Some are zoned, or have narrow whitish margins; none appear to be resorbed. Oval enclaves of very fine-grained biotite granite are present locally, generally less than 15 x 5 cm.

STRATIFIED ROCKS

Silurian(?) [S]

Sb — **Bucksport Formation.** Very fine-grained to fine-grained interlayered biotite granofels and calc-silicate granofels. Well-developed compositional layering includes biotite granofels, biotite quartzite, and calc-silicate granofels. The Bucksport Formation is inferred to underlie the southwestern corner of the quadrangle, although no outcrops were found in this study. The Bucksport Formation is widely exposed in the nearby Belfast quadrangle (Pollock, 2012).

ROCKS OF COMPLEX ORIGIN

Devonian-Ordovician(?) [DO]

DOpg — **Passagassawakeag Gneiss.** Irregularly interlayered granofels, schist and migmatite. Layered granofels is common, with layers ranging in thickness from approximately 2 to 15 cm. The fine-grained to very fine-grained granofels includes plagioclase, quartz and biotite in various proportions. Its texture is granular or sugary to a phaneritic-like igneous texture. Biotite produces a fine lamination in the more sugary textured quartz and feldspar layers, and gneissic banding in rocks with phaneritic-like textures of quartz and plagioclase. The schist is fine-grained to medium-grained biotite-plagioclase-quartz schist. A hallmark of both the granofels and schist is the presence of isolated feldspar grains and/or composite feldspar+quartz aggregates which in some places comprise up to 60% of the rock. Single grains and aggregates range from 3 millimeters to approximately 2 cm. The grains and aggregates, more common in schist, are primarily angular, blocky, or rounded, but may exhibit a mild elongation parallel to the foliation. Isolated, rounded grains impart an "augen" or "popcorn-like" structure to the rock.

At one locality along Marsh Stream there is a foliated biotite granite which strongly resembles the Winterport Granite as mapped in the Hampden quadrangle to the northeast (West and Pollock, 2016). Feldspar grains are commonly porphyroclastic, and are elongated within the foliation. The exposure at this locality includes well-developed granite mylonite with feldspar porphyroclasts.

Granite boudins or dikes of feldspar and quartz with minor biotite are parallel to layering and foliation in most outcrops. Accessory minerals include muscovite, garnet, or tourmaline. Boudins ranging from approximately 1 x 4 cm to 30 cm x 1.5 meters occur as isolated individuals or in trains. Boudins are mainly symmetrical, but some have an asymmetric shape with dextral shear sense. While granite dikes range from less than 1 cm to slightly more than a meter thick, individual dikes have nearly uniform thickness. Margins of both boudins and dikes are highly irregular with both protrusions and embayments with the enclosing schist. Some granites have concentrations of biotite schist along the margins. Cross-cutting dikes of very coarse-grained to pegmatitic granite are uncommon to rare. Feldspar megacrysts range up to 5 to 7 cm.

Thin prominent layers of equigranular feldspar-quartz-diopside ± amphibole ± epidote calc-silicate granofels are rare to uncommon. Calc-silicate grains are disseminated in most exposures, but they may be locally concentrated enough to warrant designation as calc-silicate gneiss.

Thin metabasalt dikes less than 10 cm wide were recognized at one locality. The dikes consist of greenish-black microcrystalline rock with no obvious phenocrysts.

EXPLANATION OF PATTERNS

Mylonite. Highly deformed quartzo-feldspathic rocks inferred to underlie the northwest corner of the quadrangle, based on mapping to the west in the Brooks East quadrangle, and to the north in the Snow Mountain quadrangle (West, 2016). This mylonite represents a deformed version of the Passagassawakeag Gneiss, and may be part of the regionally extensive Ray Corner mylonite zone (West and others, 2016).

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, if known. For most planar features, symbol is centered at observation point; for joints, observation point is at end of strike line opposite dip tick. For linear features, tail of symbol is at observation point. Multiple measurements at a site are represented by combined symbols. Symbols on the map are graphical representations of information stored in a bedrock database at the Maine Geological Survey. The database may contain additional information that is not displayed on this map.

- Outcrop of mapped unit, no structural information available.
- Outcrop of mapped unit, additional structural information is available but not plotted on the map.
- Float presumed to represent underlying bedrock.
- Compositional layering in metamorphic rocks; interlayered granofels and schist (inclined, vertical).
- Foliation. A general term for the planar arrangement of textural or structural features (inclined, vertical).
- Mylonitic foliation (inclined, vertical).
- Axial plane of fold (inclined).
- Fold axis (plunging).
- Thin granitic or aplitic (a) dike which cross-cuts compositional layering or intrusive rocks (inclined, vertical).
- Joint (inclined, vertical).

EXPLANATION OF LINES

Contact between rock units, of intrusive origin (approximately located, poorly located).

Structural boundary between more deformed and less deformed rocks. May be a sharp or a gradational boundary.

REFERENCES

Pollock, Stephen G., 2012, Bedrock geology of the Belfast quadrangle, Maine: Maine Geological Survey, Open-File Map 12-37, color map, scale 1:24,000.

West, David P., Jr., 2016, Bedrock geology of the Snow Mountain quadrangle, Maine: Maine Geological Survey, Open-File Map 16-26, color map, scale 1:24,000.

West, David P., Jr., and Pollock, Stephen G., 2016, Bedrock geology of the Hampden quadrangle, Maine: Maine Geological Survey, Open-File Map 16-10, color map, scale 1:24,000.

West, David P., Jr., Thompson, Woodrow B., Hooke, Roger LeB., and Pollock, Stephen, 2016, Bedrock and surficial geology in the greater Belfast-Brooks area, south-central Maine: Geological Society of Maine, 2016 summer field trip guide, 26 p.

GEOLOGIC TIME SCALE

Geologic Age		Absolute Age*
Cenozoic Era (Cz)		0-66
Mesozoic Era (Mz)		66-252
Paleozoic Era (Pz)		
	Permian Period (P)	252-299
	Carboniferous Period (C)	299-359
	Devonian Period (D)	359-419
	Silurian Period (S)	419-444
	Ordovician Period (O)	444-485
	Cambrian Period (Є)	485-541
Precambrian time (pЄ)		Older than 541

* In millions of years before present.

(Walker, J.D., Geissman, J.W., Bowring, S.A., and Babcock, L.E., compilers, 2012, Geologic Time Scale v. 4.0: Geological Society of America, doi: 10.1130/2012.CTS004R3C.)

SOURCE OF GEOLOGIC INFORMATION

Field work by Stephen G. Pollock, 2015.

SCALE 1:24,000

1 0.5 0 1 Mile

1000 0 1000 2000 3000 4000 5000 6000 7000 Feet

1 0.5 0 1 Kilometer

CONTOUR INTERVAL 20 FEET

Approximate Mean Declination, 2016 16° W

Base map features from Maine Office of GIS - 1:24,000 USGS contour lines, E911 roads, 1:24,000 National Hydrography Dataset, USGS GNIS placenames and 1:24,000 political boundaries. Map projection Universal Transverse Mercator, North American Datum, 1927.

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