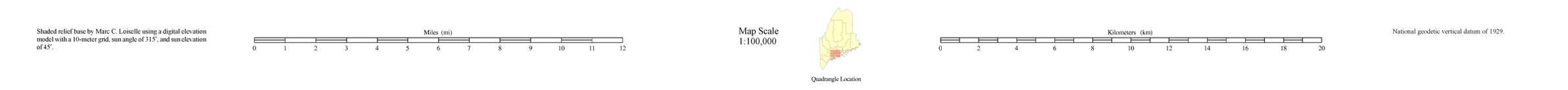
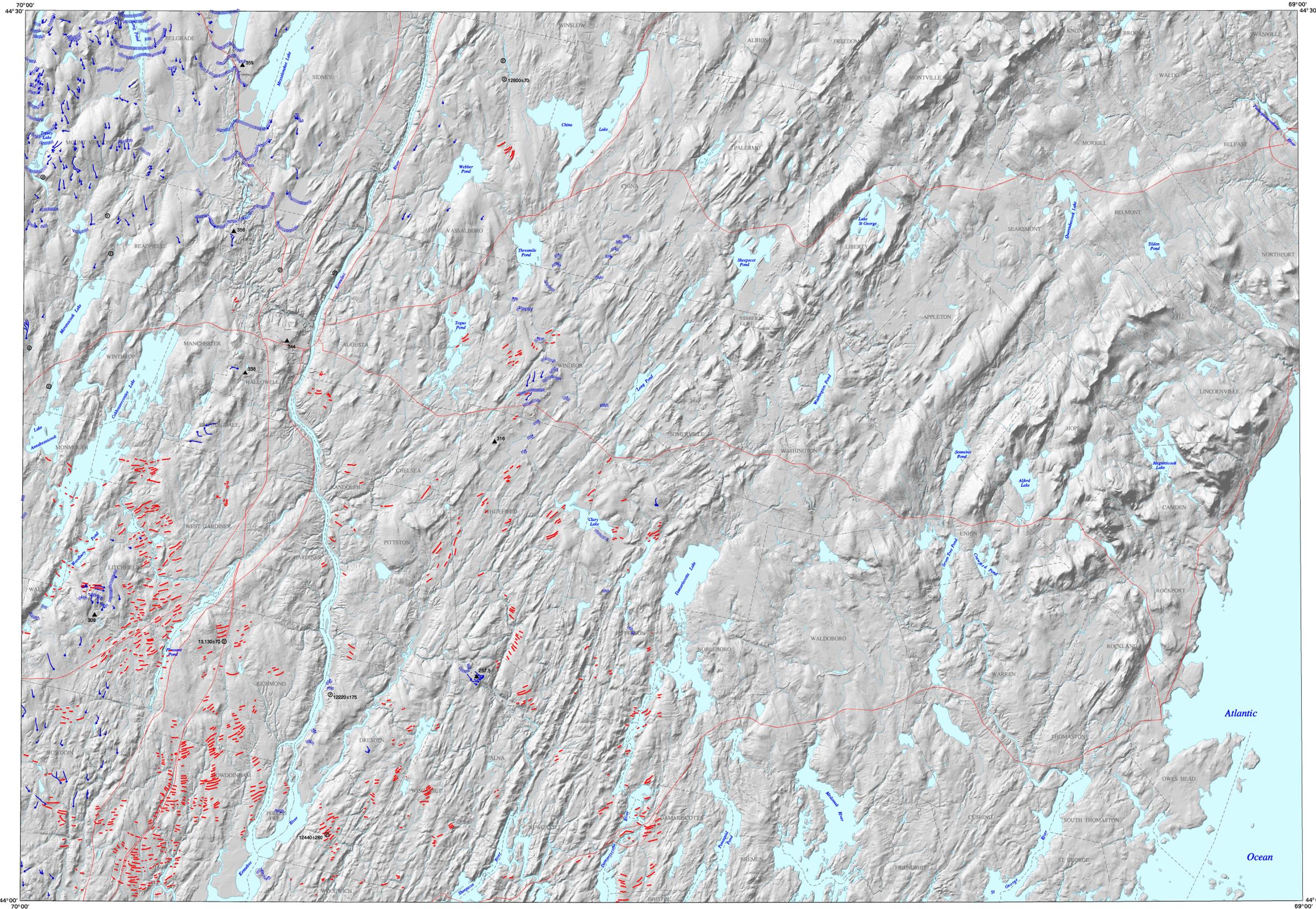


# Deglaciation Features in the Western Half of the Augusta 1:100,000 Quadrangle, Maine



## Augusta Quadrangle, Maine

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

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**Open-File Map 09-41**  
**2009**

This map shows information concerning the recession of the most recent glacial ice sheet from the Augusta 1:100,000 quadrangle in southern Maine. The Laurentide Ice Sheet originated in Canada and advanced generally southward across New England, reaching its maximum extent on the continental shelf about 28,000 to 24,000 years ago (Stone and Borns, 1986; Ridge, 2004). Subsequent deglaciation occurred through a combination of thinning of the ice and recession of the glacier margin as the climate warmed and the ice sheet melted. Marine submergence accompanied ice retreat in lowland areas of southern Maine. Several types of field evidence indicate the direction and pattern of ice retreat across the map area. This evidence occurs selectively in valleys and the area of marine submergence, where glacial processes (often involving erosion and sedimentation by meltwater streams) left a record of where the ice margin stood at various times. Moraine ridges provide the clearest indication, since most of them were deposited right along the



**Figure 1.** Aerial view of bouldery moraine ridges crossing a blueberry field in Sedgwick. Moraines such as these are widespread across southern Maine, but many of them are not so easily seen. The ice margin retreated from right to left (northward) in the area shown here. The close spacing of these moraines suggests they may be annual features, with the space between them indicating how far the ice margin receded during the summer melt season.



**Figure 2.** Bouldery moraine ridge in Cherryfield. This moraine was deposited in the sea at the edge of the last glacial ice sheet during its retreat from southern Maine. The blueberry field (foreground) is probably underlain by sandy marine sediments.



**Figure 3.** Deep pit exposure in glacial-marine delta in East Gray. This is one of many ice-contact deltas built along the glacier margin when it stood in the sea. The delta has two parts. The nearly horizontal gravel layer on top is the "topset" unit. It was laid down by glacial meltwater streams washing across the delta top. The underlying "foreset beds" are inclined in a seaward direction. They consist of sand and gravel that cascaded down the front of the expanding delta and eventually was covered by the topsets. The boundary between the two units marks the position of sea level when the deltas were built.

**REFERENCES**

Borns, H. W., Jr., Doner, L. A., Dorion, C. C., Jacobson, G. L., Jr., Kaplan, M. R., Keutz, K. J., Lowell, T. V., Thompson, W. B., and Weddle, T. K., 2004. The deglaciation of Maine. In S. A. Elias, J. and Gibbard, P. L. (editors), *Quaternary Glaciations: Extent and Chronology, Part II: North America*. Elsevier, Amsterdam, p. 89-109.

Ridge, J. C., 2004. The Quaternary glaciation of western New England with correlations to surrounding areas. In Elias, J. and Gibbard, P. L. (editors), *Quaternary Glaciations: Extent and Chronology, Part II: North America*. Elsevier, Amsterdam, p. 169-199.

Stone, B. D., and Borns, H. W., Jr., 1986. Pleistocene glacial and interglacial stratigraphy of New England, Long Island, and adjacent Georges Bank and Gulf of Maine. *Quaternary Science Reviews*, v. 5, p. 39-52.

**RELATED MAPS**

Tolman, S. S. (compiler), 2009. Glacial ice-flow indicators in the Augusta 1:100,000 quadrangle, Maine. Maine Geological Survey, Open-File Map 09-42.

Tolman, S. S. (compiler), 2009. Surficial geology of the Augusta 1:100,000 quadrangle, Maine. Maine Geological Survey, Open-File Map 09-40.

### EXPLANATION OF SYMBOLS

- End moraine. Ridge of till and/or water-laid sediments deposited at the margin of the late Wisconsinan ice sheet. The actual numbers of moraines have been reduced in areas where they are very closely spaced.
- Ice margin position. Hachured line shows position of the receding late Wisconsinan glacier margin. Most of these positions were inferred from ice-contact topography, including the heads of deltas, subaqueous fans, and other water-laid glacial deposits, as well as meltwater channels in areas above the marine limit.
- Meltwater channel. Arrow indicates channel eroded by glacial meltwater, either as a stream originating at the ice margin or by drainage from the outlet of a glacial lake.
- ▲ 350 Glaciomarine delta. Solid triangle marks site where the contact between topset and forest beds in a glaciomarine delta has been observed. Number is elevation of the contact, in meters, which indicates local relative sea level when the delta was deposited. Elevations in parentheses were measured by altimeter or estimated from topographic map contours. All other elevations were determined by precise surveys.
- 10,192±450 Dated marine fossil locality. Site where one or more radiocarbon ages have been obtained from fossil organic material. (F) = marine fossil locality, with uncorrected radiocarbon age. A correction of at least 600 years to laboratory ages of marine shells is probably needed to equate them with terrestrial ages. All of the marine ages shown on the map were obtained from shells.
- Road
- Town boundary
- County boundary
- State boundary
- Township name

### INDEX TO SOURCES OF GEOLOGIC MAP DATA

1:24,000 Surficial geologic quadrangle maps, authors, and Maine Geological Survey Open-File numbers. In some areas the original map data have been supplemented with more recent observations.

READFIELD	BELGRADE	VASSALBORO	CHINA LAKE	PALEMON	LIBERTY	MORRILL	BELFAST
C. Hildreth, 04-40	C. Hildreth, 04-45	C. Hildreth, 04-45	A. Thompson, D. Borne, 05-8				
WINTHROP	AUGUSTA	TOWNS POND	WEBER WELLS	RAZORVILLE	WASHINGTON	SEARSMONT	LINCOLNVILLE
W. Thompson, 08-78	W. Thompson, 08-7	W. Thompson, 07-101	T. Woods, 07-29				
FARGATORY	GARDNER	EAST PITTSFORD	NORTH WHITEFIELD	JEFFERSON	UNION	WEST ROCKPORT	CAMDEN
C. Hildreth, 04-46	W. Thompson, 04-4	W. Thompson, 04-4	W. Thompson, 04-11				
BOWDOINHAM	RICHMOND	WISCASSET	DAMASCUS	WALDOBORO WEST	WALDOBORO EAST	THOMASTON	ROCKLAND
C. Hildreth, 04-52	T. Woods, D. Borne, 04-15	W. Thompson, 04-15	W. Thompson, 04-4				