

Deglaciation Features in the Lewiston 1:100,000 Quadrangle, Maine

Lewiston Quadrangle, Maine

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This map shows information concerning the recession of the most recent glacial ice sheet from the Lewiston 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

edge of the glacier. Meltwater channels, and ice-contact slopes or kettle zones at the heads of water-laid sand and gravel deposits, likewise mark ice-margin positions in certain areas. Correlations of these indicators between valleys or across long distances are usually very uncertain and have not been attempted here. Ages obtained from radiocarbon dating of fossil organic remains are shown on the map. They provide minimum limits on the timing of glacial retreat. These are the original ages in radiocarbon years, as reported by the dating laboratories. They are younger than actual calendar ages by about 2,000 to 2,500 years. The deglaciation chronology of Maine needs refinement, but a summary and interpretation of available data is provided by Borns and others (2004). Photos of deglaciation features were selected from various localities in Maine and are not limited to the Lewiston 1:100,000 quadrangle.



Figure 1. Pit exposure in glacial-marine delta south of Palmer Hill in Whitefield. This is one of many ice-contact deltas built along the glacier margin where 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. The underlying "forest 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 topset. The boundary between the two units marks the position of sea level when the delta was built.



Figure 2. Glacial outwash west of Ragged Jack Mountain in the East Branch Noisicot River valley. The angular boulders and poor sorting of the gravel (center) suggest it was deposited by a fast-moving stream near the glacier margin. Very coarse gravel like the example seen here, together with hummocky "kame and kettle" topography, provide clues to the location of the ice margin in areas where moraines are lacking.



Figure 3. Channel carved in till by glacial meltwater on hillsides southwest of Moose Pond in West Paris. This is one of several deep and closely spaced channels eroded by water flowing along the front of the glacier as it retreated northward. Arrow shows location of former stream and the flow direction.



Figure 4. Moraine ridge on east side of Crooked River valley in Norway. Moraines are relatively uncommon inland from the zone of marine submergence in southwestern Maine. However, they do exist in places and mark the trend of the glacier margin during brief pauses in ice retreat.

EXPLANATION OF SYMBOLS

- End moraine. Ridge of till and/or water-laid sediments deposited at the margin of the late Wisconsin 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 Wisconsin 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. In some places the hachured lines are segmented, indicating that the ice margin positions are very uncertain and/or extrapolated across ponds and lakes.
- 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 surveyed elevation of the contact, in meters, which indicates local relative sea level when the delta was deposited.
- Marine fossil locality.
- 10,150±450 Terrestrial fossil locality. Some sites include radiocarbon ages of organic material recovered from sediment cores or split-spoon samples from test borings. See individual 7.5-minute surficial quadrangle maps for sources of age data.
- Road
- - - State boundary
- - - Town boundary
- - - LEWISTON Township name
- - - County boundary

REFERENCES

- Borns, H. W., Jr., Dorer, L. A., Dorion, C. C., Jacobson, G. L., Jr., Kaplan, M. R., Kreutz, K. J., Lovell, T. V., Thompson, W. B., and Weddle, T. K., 2004. The deglaciation of Maine, U.S.A., in Ehlers, 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 Ehlers, 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.

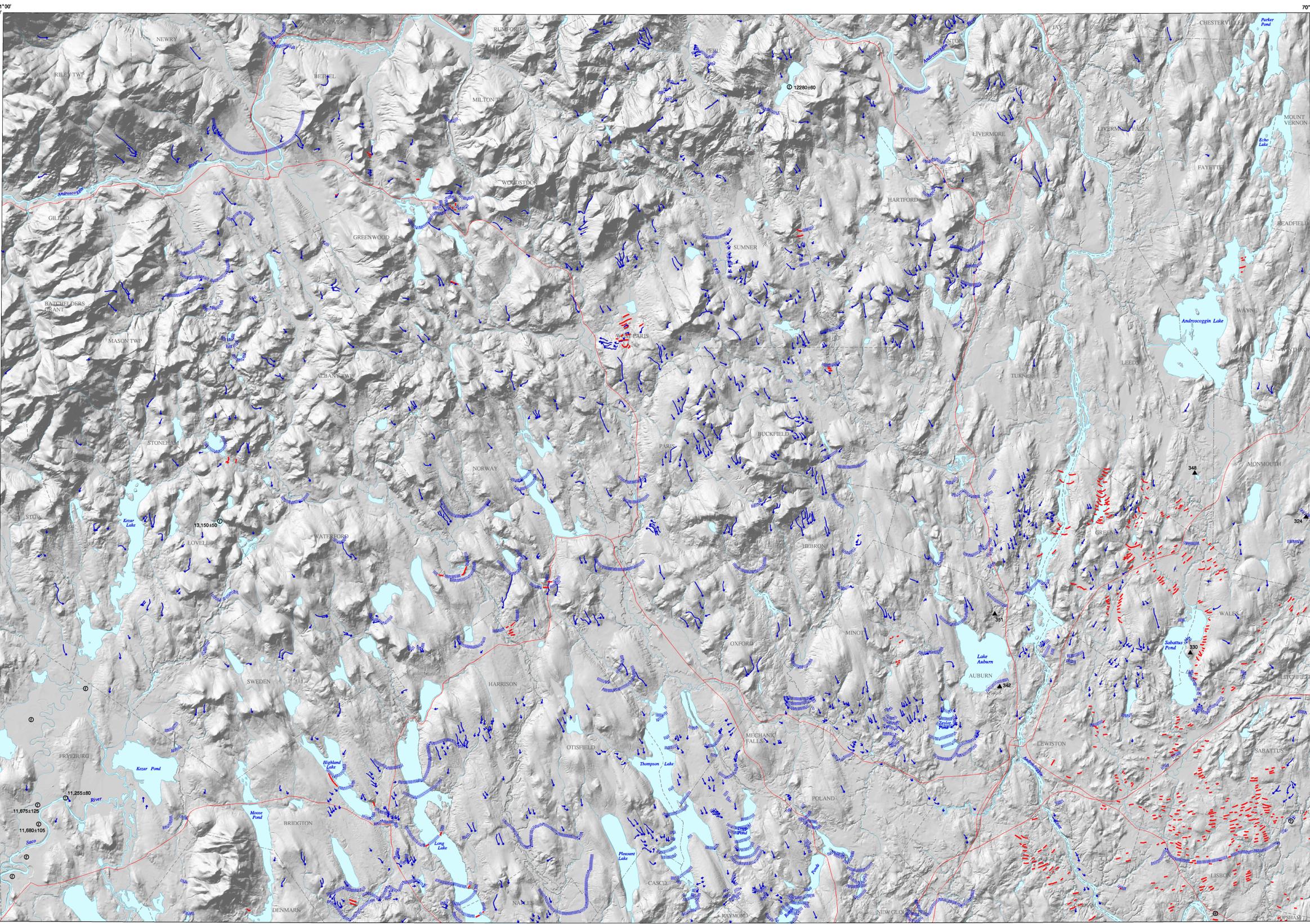
RELATED MAPS

- Tolman, S. S. (compiler), 2008. Glacial ice-flow indicators in the Lewiston 1:100,000 quadrangle, Maine: Maine Geological Survey, Open-File Map 08-51.
- Tolman, S. S. (compiler), 2008. Surficial geology of the Lewiston 1:100,000 quadrangle, Maine: Maine Geological Survey, Open-File Map 08-49.

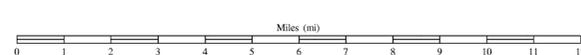
INDEX TO SOURCES OF GEOLOGIC MAP DATA

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.

GILEAD	BETHEL	BRANT	MOUNT ZION	WORTHLEY	CANTON	LIVERMORE	FAYETTE
W. Thompson	G. Smith	G. Smith					
02-87	07-44	07-61	07-88	07-92	07-102	08-43	08-44
SPELLED	EAST	GREENWOOD	WEST PARIS	WEST	BUCKFIELD	TURNER	WAYNE
W. Thompson	W. Thompson	W. Thompson	W. Thompson	C. Hildreth	C. Hildreth	G. Smith	G. Smith
02-144	05-2	07-87	08-38	08-23	08-20	08-42	08-41
CENTER	NORTH	WATERFORD	NORWAY	OXFORD	LAKE	LAKE	MONMOUTH
W. Thompson	A. Borden	A. Borden	A. Borden				
02-187	02-191	07-78	07-103	07-103	01-381	02-151	04-1
FRYEBURG	PLEASANT	BRIDGTON	CASCO	MECHANIC	MINOT	LEWISTON	LISBON FALLS
W. Thompson	W. Thompson	C. Hildreth	A. Borden				
88-7	89-6	00-138	00-141	01-478	01-478	02-251	02-154



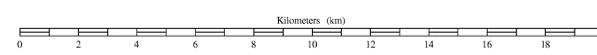
Shaded relief base by Marc C. Loisele using a digital elevation model with a 10-meter grid, sun angle of 31°, and sun elevation of 45°.



Map Scale
1:100,000



Quadrangle Location



National geodetic vertical datum of 1929.