SURFICIAL GEOLOGY
OF THE
LEWISTON
1° X 2° QUADRANGLE, MAINE

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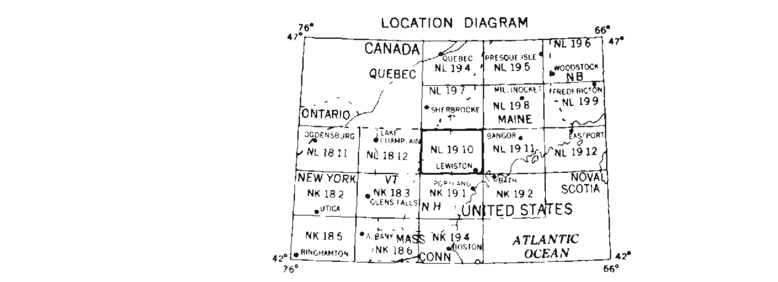

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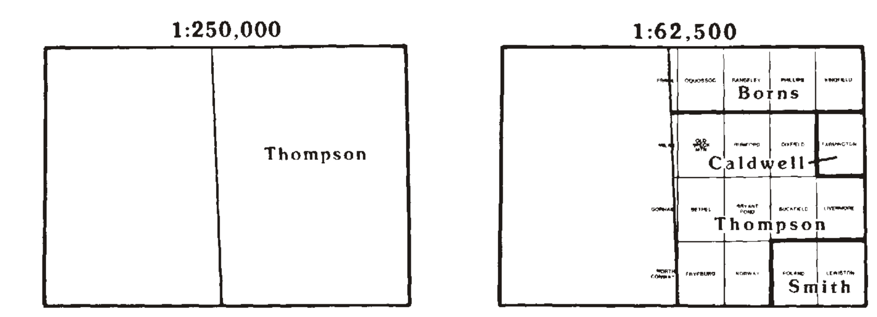

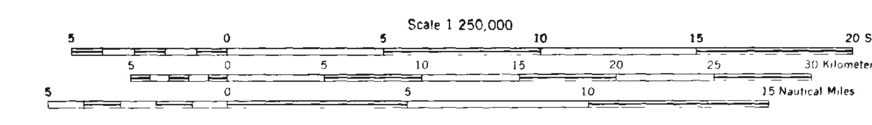

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EXPLANATION

Geologic Unit	Materials	Topography	Origin
a — Stream alluvium (includes Holocene flood plain, stream terrace, and alluvial fan deposits)	Sand, gravel, and silt.	Flat to gently sloping on flood plains and stream terraces; gently to moderately sloping on alluvial fans.	Deposited on flood plains and stream beds by postglacial streams.
s — Swamp, marsh, and bog deposits (includes both fresh-water and salt-water marshes)	Peat, muck, clay, silt, and sand.	Flat.	Formed by accumulation of sediments and organic material in depressions and other poorly drained areas.
b — Beach deposits	Sand and gravel.	Gently to moderately sloping, with low ridges and mounds.	Includes beach sediments formed by wave and current action, and sand dunes derived from these deposits.
eb — Emerged beach deposits	Sand and gravel.	Low ridges or sloping surfaces. May be associated with wave-cut benches on hillsides.	Formed by wave erosion of till or other materials during the late-glacial marine submergence of parts of southern Maine.
e — Eolian deposits	Sand.	Dune ridges and mounds, or blanket deposit that conforms to surface of underlying unit.	Windblown sand. Derived from wind erosion of glacial sediments and deposited in late-glacial to postglacial time.
L — Lake-bottom deposits	Silt, clay, and sand. Commonly well stratified, and may be rhythmically bedded.	Flat to gently sloping except where dissected by modern streams.	Composed of sediments that washed out of late Wisconsinan glacial ice and accumulated on the floors of glacial lakes. Map unit may also include a few non-glacial lake deposits.
m — Glaciomarine deposits (fine-grained facies)	Silt, clay, sand, and minor amounts of gravel. Commonly a clayey silt (the Presumpscot Formation). Sand is dominant in some places, but may be underlain by finer grained sediments. Locally fossiliferous. Map unit includes small areas of till and other units that are not completely covered by marine sediments.	Flat to gently sloping except where dissected by modern streams. Commonly has a branching network of steep-walled stream gullies.	Composed of glacial sediments that accumulated on the ocean floor. Formed during the late-glacial marine submergence of lowland areas in southern Maine.
ms — Glaciomarine deposits (coarse-grained facies)	Sand, gravel, and minor amounts of silt.	Flat to moderately sloping. Steeper on ice-contact slopes and delta fronts. May be kettled where deposited over stagnant ice blocks.	Deposited where glacial meltwater streams and currents entered the sea. Includes glaciomarine deltas, subaqueous kames and fans (subaqueous outwash), and outwash that prograded into shallow marine waters and locally covered earlier glaciomarine silt and clay deposits.
go — Glacial outwash deposits	Sand and gravel.	Flat to gently sloping. Steeper on ice-contact slopes and delta fronts. May be kettled where deposited over stagnant ice blocks.	Deposited by meltwater streams in front of the receding late Wisconsinan ice margin. Includes non-marine outwash plains, deltas, and fans.
g — Ice-contact glaciofluvial deposits (exclusive of eskers)	Sand, gravel, and silt.	Flat-topped kame terraces and deltas which are locally kettled and bounded by steep sides, or hummocky terrain with numerous kames and kettles.	Deposited by meltwater streams adjacent to stagnant glacial ice.
ge — Eskers	Gravel and sand. May include minor amounts of till. Portions of many eskers below the marine limit are partly or entirely buried by glaciomarine deposits.	Individual or multiple ridges. Complex eskers may have anastomosing patterns and be gradational with other types of ice-contact deposits.	Chiefly deposited by meltwater streams flowing in tunnels within or beneath the late Wisconsinan ice sheet. Map unit also includes small undifferentiated areas of units "g" and "go".
sm — Stagnation moraine	Mostly till, but also includes variable percentages of undifferentiated sand and gravel.	Undulating topography with local hummocks and ridges.	Deposited during the dissipation of stagnant glacial ice.
em — End moraines	Till or sand and gravel. May be very bouldery. Commonly interbedded with or overlain by glaciomarine sediments in areas that experienced late-glacial marine submergence. Only the largest end moraines and some dense clusters of smaller ones are shown here as a separate unit (em). Elsewhere, short lines mark the crests of moraine ridges, which are locally so numerous that only selected individuals are represented.	Ridges. Commonly arcuate, discontinuous, and in groups. May be multi-crested and hummocky. Size range: 1-30 m high, 5-200 m wide, and 30 m to over 10 km long.	Deposited in the marginal zone of the late Wisconsinan ice sheet, by glacial ice and/or meltwater flowing out of the ice.
rm — Ribbed moraine	Till is the principal constituent, but stratified sediments are present in some of the deposits.	Numerous hummocks and short sub-parallel ridges which typically occur in lake basins and other lowland areas.	Origin uncertain. Deposited either at the margin of or beneath the late Wisconsinan ice sheet.
t — Till	Heterogeneous mixture of sand, silt, clay and stones. May include many boulders. Generally massive, but in many places contains beds and lenses of variably washed and stratified sediments.	Generally a blanket deposit that conforms to the underlying bedrock topography. Also forms drumlins and other glacially streamlined hills.	Deposited directly by glacial ice.
Thin drift	Area of many bedrock outcrops and/or thin surficial deposits (generally less than 3 m thick). The type of surficial material is known or inferred.	Topography of these areas reflects the configuration of the bedrock surface, and ranges from smooth undulating hills to knobby terrain and high mountains.	Commonly the result of non-deposition of glacial sediments, but the surficial materials in some coastal areas have been largely removed by marine erosion in late-glacial time.
tdu — Thin drift, undifferentiated	Area of many bedrock outcrops and/or near-surface bedrock where the surficial materials have not been mapped.	Same as other thin-drift areas.	Same as other thin-drift areas.
rk — Bedrock	Area of extensive bedrock outcrop, or where the bedrock has only a thin cover of soil and vegetation. Surficial deposits are essentially absent. Particularly common on the ridge crests and steeper slopes of mountainous areas.	Hilly to mountainous terrain.	Same as the thin-drift areas.

GEOLOGIC SYMBOLS

Symbol	Name	Description
—	Contact	Boundary between adjacent map units.
~ (red)	Moraine ridge	Lines mark the crests of individual end moraines. Symbol also is used in conjunction with unit rm to show orientation of drift ridges of uncertain origin.
	Glacial striation locality	Includes striations, grooves, crag-and-tails, and other types of ice-flow indicators on bedrock outcrops. Dot indicates point of observation. Arrowhead is omitted where ice-flow direction is uncertain. Flags indicate older trends.
	Glacially streamlined landform	Symbol shows long-axis orientation of drumlins, fluted till ridges, roches moutonnees, and other hills that have been elongated parallel to the flow of glacial ice.
	Cirque	Steep-walled, semicircular bedrock basin formed by glacial erosion in high mountainous areas.
	Meltwater channel	Channel eroded by glacial meltwater stream. Arrow indicates known or inferred direction of stream flow.
▲ 288	Glaciomarine delta	Number indicates surveyed altitude (in feet) of contact between topset and foreset beds, or of meltwater channel on delta surface, which approximately marks position of sea level in late-glacial time.
△ 343	Glaciolacustrine delta	Number indicates approximate altitude (in feet) of former glacial-lake surface.
▲ 269	Delta of uncertain origin	Delta formed near limit of late-glacial marine submergence. Number indicates approximate altitude (in feet) of contact between topset and foreset beds.

SITES OF SPECIAL INTEREST

● Location of special site

This list includes locations of important stratigraphic sections of Pleistocene deposits in Maine, and places where good examples of certain glacial features can be seen. The sites were selected partly on the basis of accessibility, ease of observation, and relative permanence. Some features, such as eskers and DeGeer moraines, are so numerous that only a few of the best examples are included here.

Site	Town	Name/Description	Principal References
1	Oxford	Good example of an esker.	Borns (1); Leavitt and Perkins (17)
2	Wayne	Desert of Wayne; extensive area of late-glacial eolian sand with historically reactivated dunes.	Caldwell (6)
3	Gilead (and Shelburne, N.H.)	Androscoggin Moraine; large end moraine deposited during deglaciation of the Androscoggin Valley.	Stone (27); Thompson (30)
4	Woodstock	Good example of an esker.	Borns (1); Stone (27)
5	Chesterville	Good example of an esker.	Borns (1); Stone (27)
6	New Sharon	New Sharon till section; exposure along bank of Sandy River showing tills separated by water-laid sediments containing tree remains.	Caldwell (5)
7	Phillips	Daggett's Rock; largest reported glacially transported boulder in Maine.	Caldwell (7)
8	New Portland	New Portland till section; exposure along bank of Carrabassett River showing interbedded tills and lake sediments.	Borns and Calkin (3)

RADIOCARBON-DATED SITES

Explanation of symbols used to designate sites on the map:

- Material in place between late Wisconsinan tills.
- Material that predates or is contemporaneous with the advance of the late Wisconsinan ice sheet.
- Material that postdates or is contemporaneous with the recession of the late Wisconsinan ice sheet.
- Material that approximately dates the onlap of the sea during the late-glacial marine transgression.
- Material that approximately dates the offlap of the sea.

Site	Name/Town	Date (yr B.P.)	Laboratory No.	Material	Reference
A	New Sharon	>52,000	Y-2683	wood between tills	Borns and Calkin (3)

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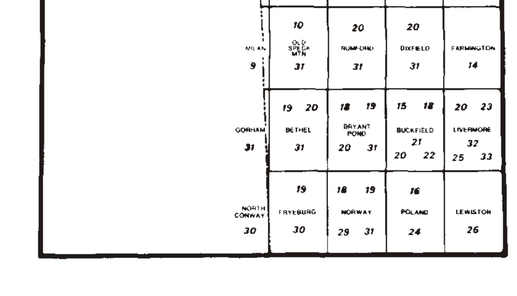
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