

Maine's Ice Age Trail Down East

The Maine landscape is made up of many interesting features created by vast sheets of glacial ice that covered Canada and the northern United States during the Ice Age. The Ice Age Trail will take you through one of the finest and most accessible areas of glacial moraines, deltas and eskers. It is located along the coastal "Down East" section of Maine and follows the retreating margin of the last great North American continental glacier, called the Laurentide Ice Sheet. The trail consists of stops along highways and country roads. It will take you from the top of Cadillac Mountain in Acadia National Park, across the spectacular and remote sand barrens that are home to some of the nation's largest wild blueberry crops, and on to the easternmost tip of the United States.

Following the Ice Age Trail

You can visit many interesting sites along the Ice Age Trail in an afternoon, or explore larger sections of the trail in day or two. As you travel the Trail, please note that much of it crosses rural areas. There are few stores, gas stations or motels, except in the larger towns, as indicated on the map. Plan your needs accordingly. The season may affect your experience; for instance, many of the blueberry barrens are quite busy during harvest time, and some coastal sites are best viewed at low tide, but the Trail can be explored year-round.

Global changes during the Ice Age

Rapid, dramatic and extreme changes in global environments have occurred during the last 2.5 million years of Earth's history, called the Ice Age. These changes caused glaciers of continental proportions (ice sheets) to repeatedly expand and contract across northern regions of North America, Europe and Asia. Global sea level dropped during each glacial episode, as great volumes of water were held in the ice sheets. At the same time, the weight of the thick continental ice sheets was so enormous that it depressed the Earth's crust, which later rebounded to its former level when the ice melted away. The interaction of these fluctuating land and sea levels resulted in alternate flooding and emergence of coastal areas.

Some areas of the world that are now desert became fertile during the Ice Age and supported herds of animals. The cool, moist climate produced large lakes that have since dried up or greatly diminished. Huge Arctic fauna, including mammoth, rhinoceros, reindeer, musk ox and bison, lived on the tundra and grassland that covered most of Europe and parts of North America south of the ice sheets. And finally, the last 2.5 million years saw the evolution of modern humans.

The Ice Age in Maine

As in other parts of the world, each successive advance of the continental ice sheets modified or

obliterated the record of earlier glaciations. In many places, older glacial features were either buried by the sedimentary deposits of younger ice sheets or they were eroded away by the flowing ice. The Laurentide Ice Sheet flowed southeast across Maine and terminated on Georges Bank in the Gulf of Maine about 25,000 years ago. At that time, the ice sheet covered all of Maine to a depth of at least 1.5 miles. The weight pushed the Earth's crust downward over 500 feet.

With rapidly rising global temperatures, the southern margin of the Laurentide Ice Sheet began to retreat across the Gulf of Maine shortly before 21,000 years ago. Global sea level had been about 300 feet lower than present during the greatest extent of the ice, but the land remained depressed for a time as the ice sheet retreated. This lingering depression enabled an arctic sea to flood low areas in coastal Maine starting around 17,000 years ago as the ice margin retreated. The landforms created during the marine submergence, including deltas and shorelines, are among the most distinctive features of the Ice Age Trail.

Eventually the rebound of the Earth's crust exceeded the rate of global sea-level rise, so the ocean began to recede and the ocean bottom emerged even as the ice was still disappearing. About 12,900 years ago the shoreline fell to around 180 feet below present level. Subsequently, the continual rise of global sea level brought the ocean close to its present position about 3,000 years ago.

Just after the glacial retreat, much of Maine was a

treeless tundra that supported large animals, such as woolly mammoths. Warming of the climate allowed the northward migration of a cold northern forest, which in turn was replaced by the forest of today. The nomadic Paleoindians (the earliest human occupants of North America), arrived in Maine between about 13,000 and 11,000 years ago during an extremely cold time when residual masses of glacial ice were still melting in parts of northern Maine.

As research progresses, it is becoming clear that the glacial record in Down East Maine reflects drastic and abrupt atmospheric temperature and oceanic changes that brought the world into its present condition. It can now be demonstrated that this chronological record is the same as those from other North Atlantic regions, including Greenland and northwestern Europe. This record is one of the keys in developing an understanding of the causes of global ice ages and predictive models of future climate change.

Please note: Use caution when pulling off the highways and byways to explore any of the Ice Age Trail stops. Many are beside commonly traveled rural roads and thoroughfares. **Many of the features along the Trail are on private property. Please observe these from the public roadway. Do not walk in the blueberry fields or pick the berries. When observing any of the geological sites, please leave them as you found them so that others can enjoy the wonders of Maine's Down East Ice Age Trail for years to come.**



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Project Manager: Professor Harold W. Borns, Jr., Professor Emeritus of Glacial and Quaternary Geology.
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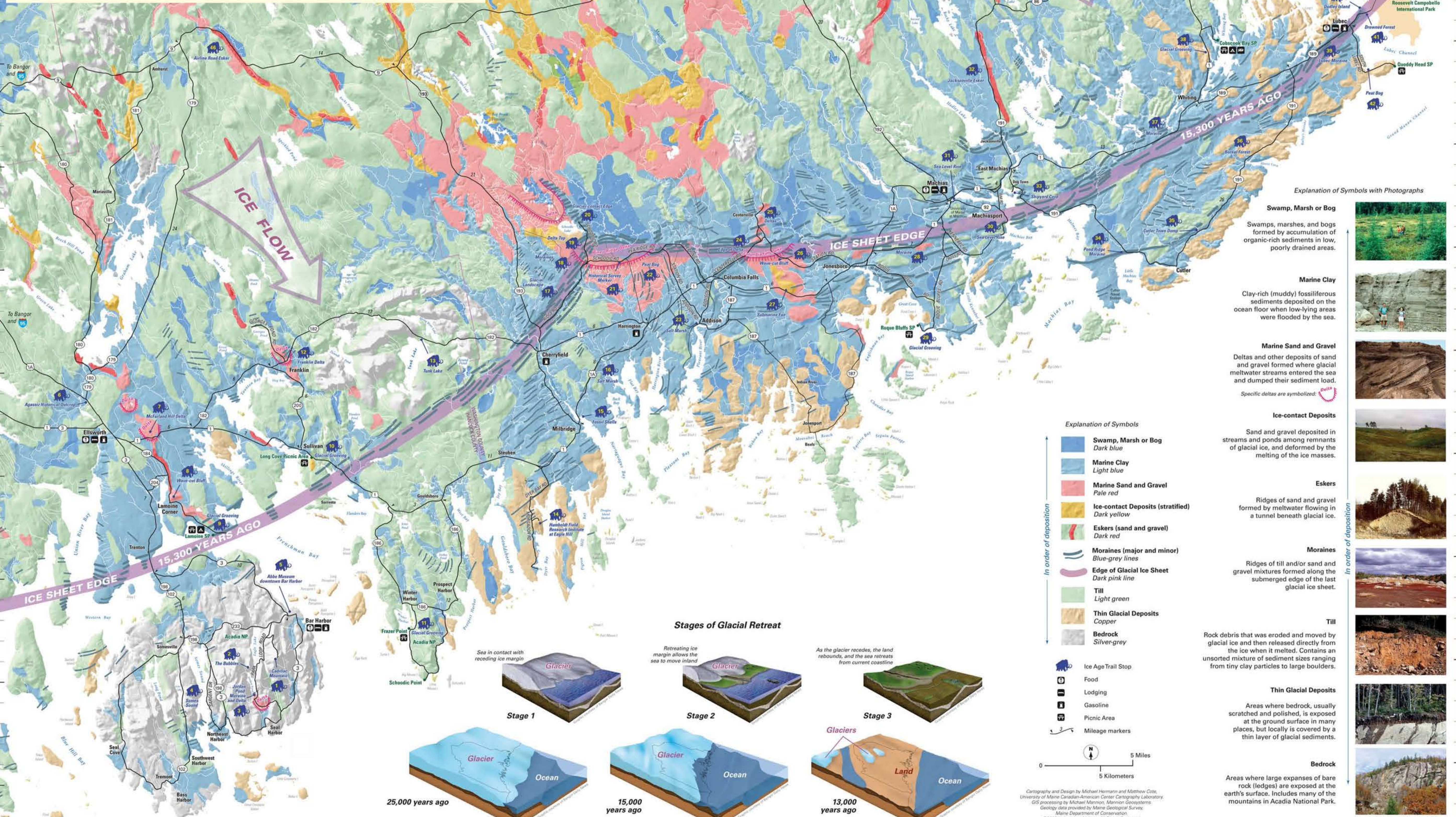
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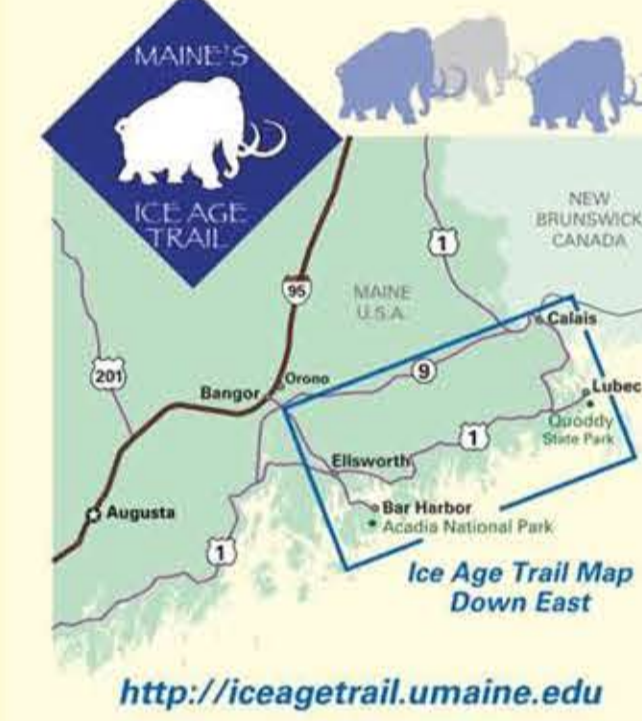
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Maine's Ice Age Trail Down East Map and Guide

Explore the glacial geology of Maine with this self-guided tour map

46 glacial stops to see and learn about the last Ice Age



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- Explanation of Symbols with Photographs**
- Swamp, Marsh or Bog**
Swamps, marshes, and bogs formed by accumulation of organic-rich sediments in low, poorly drained areas.
 - Marine Clay**
Clay-rich (muddy) fossiliferous sediments deposited on the ocean floor when low-lying areas were flooded by the sea.
 - Marine Sand and Gravel**
Deltas and other deposits of sand and gravel formed where glacial meltwater streams entered the sea and dumped their sediment load.
 - Ice-contact Deposits**
Sand and gravel deposited in streams and ponds among remnants of glacial ice, and deformed by the melting of the ice masses.
 - Eskers**
Ridges of sand and gravel formed by meltwater flowing in a tunnel beneath glacial ice.
 - Moraines**
Ridges of till and/or sand and gravel mixtures formed along the submerged edge of the last glacial ice sheet.
 - Till**
Rock debris that was eroded and moved by glacial ice and then released directly from the ice when it melted. Contains an unsorted mixture of sediment sizes ranging from tiny clay particles to large boulders.
 - Thin Glacial Deposits**
Areas where bedrock, usually scratched and polished, is exposed at the ground surface in many places, but locally is covered by a thin layer of glacial sediments.
 - Bedrock**
Areas where large expanses of bare rock (ledges) are exposed at the earth's surface. Includes many of the mountains in Acadia National Park.
- Explanation of Symbols**
- Swamp, Marsh or Bog: Dark blue
 - Marine Clay: Light blue
 - Marine Sand and Gravel: Pale red
 - Ice-contact Deposits (stratified): Dark yellow
 - Eskers (sand and gravel): Dark red
 - Moraines (major and minor): Blue-grey lines
 - Edge of Glacial Ice Sheet: Dark pink line
 - Till: Light green
 - Thin Glacial Deposits: Copper
 - Bedrock: Silver-grey
- Ice Age Trail Stop Symbols:**
- Food: Fork and knife icon
 - Lodging: Bed and breakfast icon
 - Gasoline: Gas pump icon
 - Picnic Area: Picnic table icon
 - Mileage markers: Mileage sign icon
- Stages of Glacial Retreat**
- Stage 1 (25,000 years ago):** Glacier covers the entire landmass. Sea level is low.
 - Stage 2 (15,000 years ago):** Retreating ice margin allows the sea to move inland.
 - Stage 3 (13,000 years ago):** As the glacier recedes, the land rebounds, and the sea retreats from current coasting.
- Scale:** 5 Miles / 5 Kilometers
- Cartography and Design by Michael Herrmann and Matthew Cote.**
University of Maine Canadian-American Center Cartography Laboratory.
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