

# Ice Age

NATIONAL SCIENTIFIC RESERVE • WISCONSIN

ADMINISTRATION/INFORMATION

**Ice Age National Scientific Reserve was established on May 29, 1971, as a unit of the U.S. Department of the Interior's National Park Service to be administered by the State of Wisconsin, Department of Natural Resources. The director of the State Bureau of Parks (Pyare Square Building, 4610 University Avenue, Box 450, Madison, Wisconsin 53701) is in overall charge of the operation of the National Scientific Reserve.**

**State of Wisconsin / Department of Natural Resources**

**National Park Service  
U.S. DEPARTMENT OF THE INTERIOR**

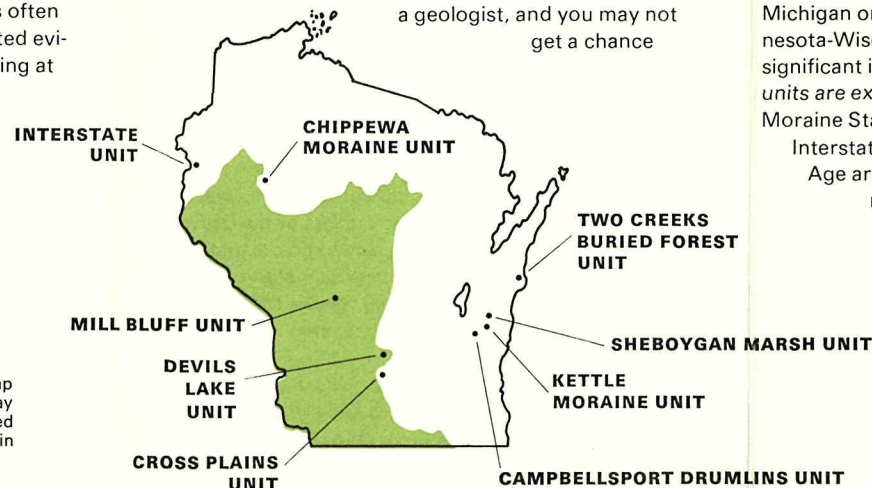
Fly over southeastern Wisconsin at moderate height; then observe the landscape at ground level. You'll notice that certain distinctively shaped hills and ridges occur repeatedly, and in patterns that rule out the possibility of random distribution. These recurring landforms are mementos of the Wisconsin glaciation, the most recent major episode in Earth's geological history. Because each was shaped by the ice sheet under a special set of conditions, it is fairly easy for students of glacial geology to recognize them. For example, you should be able to identify some of the drumlins—the most familiar of Wisconsin glacial features. Just imagine a half of a hard-boiled egg (cut lengthwise) laid on its flat surface; stretched out to about 1,000 meters (3,300 feet) in length, half that in width, and about 25 meters (80 feet) in height; and covered with grass and trees. This is an approximation of a drumlin.

Drumlins are deposits of rock and clay laid down and streamlined by the moving ice of the glacier. It is often possible, from their alignment and from associated evidence, to determine which way the ice was moving at the time they were made. Typically, the small end of the "egg" points in the direction of ice flow. The State of Wisconsin has about 5,000 drumlins and thousands of other landforms recognizable as having been born of the ice sheet. Much of the State's scenic interest lies in these landforms and the life communities that have developed on them.

The (green) area of the map shows that part of present-day Wisconsin that was not covered by any stage of the Wisconsin ice sheet.

The great sequence of events that did so much to shape the landscape of the northern half of North America and Europe spanned perhaps 1,500,000 years. The Wisconsin stage, the latest series of glacial advances and retreats, began possibly 70,000 years ago and ended only 10,000 years ago. In fact, we can't even be certain that we are not still in the Ice Age, merely enjoying a warm period between two glacial advances.

This knowledge, strangely, is only about a century old. Until the mid-nineteenth century no one could account satisfactorily for drumlins, kames, eskers, kettles, moraines, and other such phenomena. It was the great Swiss naturalist Louis Agassiz who announced to a skeptical world the bold new theory of continental glaciation. Today it is universally accepted and is the focus of a whole branch of geologic investigation. You may not be a geologist, and you may not get a chance



to fly over Wisconsin, but you can get a good introduction to ice-age geology by visiting the areas set aside as the Ice Age National Scientific Reserve.

Ice Age National Scientific Reserve is a unit of the National Park System administered by the Wisconsin Department of Natural Resources. This cooperative planning and development effort is concerned with a nationally significant glacial landscape and its human and natural history. Geologists have found that many of Wisconsin's most outstanding Ice Age features had been removed or partially destroyed by man. The late Raymond Zillmer, a Milwaukee lawyer who studied and enjoyed these glacial landforms over the years, felt that those remaining should be preserved. The efforts of Zillmer and others resulted in passage by Congress in 1971 of legislation providing for such protection.

The Ice Age National Scientific Reserve consists of nine separate units located across the State from Lake Michigan on the east to the St. Croix River on the Minnesota-Wisconsin border. Each unit possesses features significant in the story of Wisconsin glaciation. Four units are existing State Parks or Forests: The Kettle Moraine State Forest, and Devils Lake, Mill Bluff, and Interstate Parks. Lands for the five undeveloped Ice Age areas are currently being acquired. In the near future, each of the nine units will have new or expanded interpretive facilities and services.

**A SUGGESTED TOUR ROUTE**

The close proximity of the Campbellsport Drumlins to the Kettle Moraine and Sheboygan Marsh offers you an opportunity to enjoy a leisurely scenic tour of three of the nine Ice Age units.

State Highway 67 joins the Campbellsport Drumlins with the Kettle Moraine Ice Age unit 26 kilometers (16 miles) to the east. County Trunk P through the village of Glenbeulah at the north end of the Kettle Moraine takes you to the Sheboygan Marsh unit.

**CAMPBELLSPORT DRUMLIN UNIT**

Ten kilometers (6 miles) west of the Kettle Moraine unit, off Wis. 67, the farmlands swell into long, rounded hills marking the location of the Campbellsport Drumlin Ice Age unit. Bordered by County Trunk Y on the south and County Trunk V to the east, this area is easily reached via Wis. 41 or 45 and Wis. 67.

The Campbellsport unit, like much of southeastern Wisconsin's farmland, is dotted with the elongate, rounded hills known to geologists as drumlins. Scientists have long recognized these features and have identified nearly 5,000 in Wisconsin. They cannot, however, agree to their origin, except to say that they tend to lie parallel to the direction of movement of the glacial ice.

The drumlins northwest of Campbellsport are not the highest, longest, or the most perfectly formed drumlins in Wisconsin. They do, however, offer an opportunity to view a number of different drumlins closely concentrated in one area, and to see how man has used them.

Early settlers cleared the drumlin hillsides and used the timber to build their barns and farmhouses. Crops

were planted between the hills and on their gently sloping sides. Livestock grazed on the steeper slopes, and the hilltops were often left wooded to provide firewood and fenceposts. Modern farm machinery now allows farmers to till more of this land, but many of the drumlins still wear forested caps.

Eventually three scenic overlooks along a self-guiding tour route will be developed at the Campbellsport Drumlin unit. This route will include interpretive signs to help you better understand the drumlins and their part in the glacial story.

While overlooks and exhibits have not yet been constructed, roads in the area offer an opportunity for a leisurely scenic drive. Along the way you'll see the patterns of man's use of the land.

As you view the rounded contours of the drumlins, try to imagine this landscape when it was covered by hundreds of meters of glacial ice.



**WE'RE JOINING THE METRIC WORLD**

The National Park Service is introducing metric measurements in its publications to help Americans become acquainted with the metric system and to make interpretation more meaningful for park visitors from other nations.

Superlative among the Ice Age units from the standpoint of variety, abundance, and magnitude of its glacial features is the northern unit of the Kettle Moraine State Forest. Located 80 kilometers (50 miles) north of Milwaukee, this Ice Age area can be reached easily via U.S. 45 and Wis. 67 from Milwaukee or Fond du Lac, or via Wis. 23 from Sheboygan. The Kettle Moraine Scenic Highway provides access to and circulation through the State Forest.

The famous Kettle Moraine was formed as the ice of the Green Bay lobe and the Lake Michigan lobe came together. Blocks of ice buried within the deposited material melted to form the numerous kettles that dot the surface and give the rugged interlobate moraine its name.

Aside from the diverse sizes and shapes of the kettles, many other splendid examples of glacial features created by ice and water action are present. Here are found some of the world's finest examples of moulin kames. These are conical hills formed when material is washed by streams into holes in the glacial ice. Many

moulin kames here are further accentuated because they rise from a broad, flat, plain formed by sediments that inwashed between the two moraines.

Winding through parts of the Kettle Moraine Ice Age unit is Parnell Esker, one of the best known examples of this glacial feature—a sinuous ridge formed by water running beneath the ice sheet. Portions of other eskers not destroyed by erosion or by man's activities can also be seen here.

For a long time, Indians lived here, foraging, hunting, and fishing. Early settlers found the flat inwash land between the rugged, forested hills valuable for farming.

In recent years, the area has been increasingly important for recreational purposes, and the State of Wisconsin has been acquiring land for Kettle Moraine State

**SHEBOYGAN MARSH UNIT**

Just west of the small Town of Elkhart Lake, lying 30 kilometers (19 miles) west of Sheboygan via Wis. 23 and 67, is a marsh-covered area of thousands of hectares, once the site of a large glacial lake. Sheboygan Marsh County Park comprises almost one-half of this environment. A rich source of wetland plant and animal life, it also demonstrates the effects of man's efforts to control and use a rich marshland.

As the ice of the Green Bay lobe moved southeasterly, it caused the formation of a large basin. Glacial Lake Sheboygan was formed in this basin by water from the melting glacier. This same melt water carried sediment which (in combination with sediment carried into the basin by the Sheboygan River following the glacier's retreat) gradually filled the Lake. Today a large marsh overlying more than 30 meters (100 feet) of sediment is all that remains of Glacial Lake Sheboygan.

Indians, attracted by the good hunting and fishing and plentiful plant foods, settled in the area. Later, farmers attempted to drain the flat marshland for agricultural uses. Remnants of their canals remind us of their failures. A dam within the county park controls the marsh water level, and natural succession continues.

Interpretive facilities are not yet available, but a community-oriented picnic, boating, and fishing area is near the dam off County Trunk P immediately west of Elkhart Lake. Future development will include nature trails to facilitate observation of the marsh's abundant plant and animal life. Exhibits on a high hill overlooking the marsh will tell how the glaciers formed Lake Sheboygan and how the lake became a rich marshland.

**FEES**

Entrance and use fees are charged at some units of the Scientific Reserve. Both the Federal Golden Eagle and Golden Age Passports and Wisconsin Department of Natural Resources Admission Stickers are honored in payment of these fees.

Forest. Thousands come each year to camp, hike, fish, or just enjoy the varied landscape.

Interpretation of Ice Age features is an important part of the State forest program. Roadside markers along a self-guiding auto trail tell part of the glacial story. The Glacial Hiking Trail winds over and past many significant features. Naturalists present programs on glacial history along with other programs of human and natural history.

Information about these trails and interpretive programs, as well as the recreational facilities of the area, may be obtained at the State Forest Headquarters at Mauthe Lake, 11 kilometers (7 miles) south of Dundee off County Trunk G.

Additional interpretive displays and exhibits, an Ice Age Visitor Center, and increased naturalist programs are planned for the future.

Two areas, one in eastern and one in southern Wisconsin, designated as units of the Ice Age National Scientific Reserve, are as yet undeveloped but display striking evidences of glacial action. On the shore of Lake Michigan 26 kilometers (16 miles) north of Manitowoc on Wis. 42 is the Two Creeks Buried Forest. Twenty kilometers (12 miles) west of Madison, easily reached by U.S. 14 or Wis. 151, is Cross Plains.

**TWO CREEKS BURIED FOREST UNIT**

This area is world famous among geologists for the evidence it contains of advances and retreats of the Wisconsin glacier.

During an interglacial period, a forest of spruce, hemlock, and associated plants grew along the shore of Lake Michigan. A later period of glacial advance covered and preserved the vegetation in a layer of glacial clay, sand, gravel, and boulders. Erosional forces uncovered this organic layer; by carefully examining the soil above and below it, scientists discovered much about the most recent period of glaciation. Radiocarbon dating shows that this forest was alive 11,850 years ago. Water-deposited materials indicate that twice after the ice retreated this land was covered by waters about 100 meters above the present-day levels of Lake Michigan. This adds to our knowledge of the effect of glaciers and their melt water on levels of the Great Lakes.

Future plans include an archeological dig to reveal the buried organic materials. Exhibits will show how the environment was changed during glacial periods, the present distribution of some of the plants buried here, and how and why the lake levels changed.

**CROSS PLAINS UNIT**

This area provides striking evidence of the glacier's farthest venture into the Driftless Area, an "island" of nearly 4,000,000 hectares (9,600,000 acres) in Minnesota, Iowa, Illinois, and Wisconsin that was apparently never covered by ice. Its high bluffs, rugged cliffs, and well drained river valleys are in marked contrast to much of Wisconsin's topography. The area provides a glimpse into the past; much of Wisconsin looked like this before the visits of the glaciers.

At Cross Plains, where the glacier's movement ceased, the end moraine is relatively thin and rests on bedrock. At one point just a few meters from the moraine are sculptured limestone outcrops that would have been destroyed had glacial ice covered them—clues indicating the line of farthest glacial advance.

Located above Wisconsin's Black Earth Creek Valley, this area also provides evidence of the formation of small marginal proglacial lakes and marginal drainageways. One of these drainageways actually cut back under the ice sheet itself, forming a deep gorge running north and south through the unit.

The entire unit remains in private ownership and is not yet open to the public. In the future, exhibits will explain the glacial story. An interpretive trail will allow visitors to view the end moraine, sculptured limestone formations, and glacial drainageways, and will provide a splendid view of the Driftless Area and the Black Earth Creek Valley. A self-guiding auto and biking tour from Madison to Cross Plains will follow the end moraine closely, with views of both glaciated and unglaciated landscape.

To see the contrast between the Driftless Area to the west and the glaciated lands to the east and north, drive west from Madison on Wis. 151, west on County Highway PD, Shady Oak Lane, and Timber Lane, and then north to Cross Plains along Cleveland Road.

