

**The Kettle Moraine State Forest turns gold: a
50 year celebration of the great glacier.
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The **KETTLE MORaine** **STATE FOREST** *turns gold:*

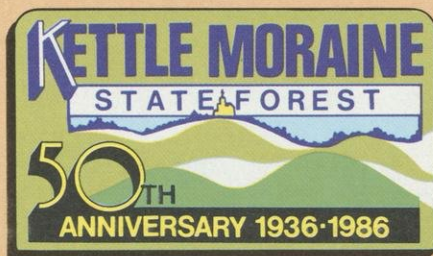


A 50 year celebration of the great glacier



Kettle, formed when a giant cake of ice melted underground.

Photo by Ron Kurowski



Millenia ago, the alternate thaw-and-freeze and the giant, inch by inch plod-and-recede of the last great glacier created the distinctive Kettle Moraine landscape in Wisconsin. Unique kettles, outwash plains, kames and eskers were revealed in the wake of the glacial retreat. For more than 10,000 years a succession of different plants, animals and people used them, leaving an imprint of change. But the glacial forms remained and to preserve as many as possible the state, 50 years ago, officially delineated and started to purchase a Kettle Moraine State Forest. So this year, 1986, is the golden anniversary and this is the commemorative publication. It will detail the history, geology and natural features that have made this region such an unspoiled world-class attraction.

Cover: The Dundee Kame, a world renowned glacial feature of the Kettle Moraine State Forest. Photo by Roger Reif

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Photo by Ron Kurowski

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Special pullout includes key to geologic, historic and other features

Description

The glacial topography of the Kettle Moraine area is distinctive. It features parallel, steep-sided ridges, conical hills, kettle-like depressions, and flat outwash plains that run southwesterly for more than 120 miles from Manitowoc County to Walworth County. Although in some places the moraine rises to 300 feet or more above lands to the east and west, it is not a continuous divide. A few of

the conical hills in these formations are conspicuous. Holy Hill measures 1,361 feet above sea level and is 340 feet higher than the stream valley to the east. Lapham Peak, which towers above Lake Nagawicka, and Sugar Loaf or Pulford's Peak at Pike Lake show similar sharp landscape contrast and have similar statistics.

Thanks to a succession of visionary individuals and groups,

about 45,000 acres in this unique stretch of glacial features are preserved in public ownership as the Kettle Moraine State Forest. There are 27,500 acres in the Northern Unit and 17,600 acres in the Southern Unit. Both attract thousands of visitors to swim, camp, study nature, hike, ride horses, ski, hunt, fish and enjoy all manner of outdoor recreation.

Special thanks for the material included in this 50th anniversary Kettle Moraine State Forest publication go to Edgar W. Trecker Jr., Southeast District Parks and Fire Control Supervisor; Superintendent Walter J. Adams and Naturalist Roger C. Reif of the Forest's Northern Unit; and Superintendent Bruce A. Chevis and Naturalist Ronald C. Kurowski of the Forest's Southern Unit. Ron and Roger wrote a large portion of the text.

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They beat the Kettle drum

Over the last 50 years a succession of prominent conservationists recognized the Kettle Moraine as a geologic and recreational treasure that needed public ownership to preserve it. Their names form a Wisconsin roster of natural resource leaders, many of them former State Conservation Commissioners, park officials, legislators or members of the Izaak Walton League in the days when the League was a power in Madison.

At the time of the 800-acre gift which formed the forest's nucleus, the League's president was Haskell Noyes, later a State Conservation Commissioner and founder of an award still given to outstanding DNR wardens. Other prominent League members back then were F.W. Luening, Sherman Brown, Joseph Quarles, August Peter, J.H. Nunnemacher, Harold A. Pripps and Clarence J. Allen.

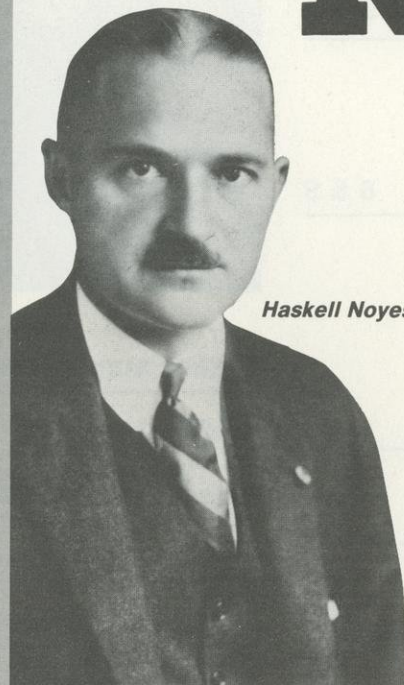
Attorney Raymond T. Zillmer, a hiker and avid outdoorsman who started the Ice Age Park and Trail Foundation, was especially prominent in efforts on behalf of the Kettle Moraine. Zillmer helped persuade a succession of different governors and legislators to approve land acquisition money. More recently, Representative Henry S. Reuss was instrumental in obtaining congressional approval designating part of the Northern Kettle Moraine as a segment of the Wisconsin Ice Age National Scientific Reserve.

Among other benefactors have been Clarence O'Conner, Stanley Perry and Leo Tiefenthaler.

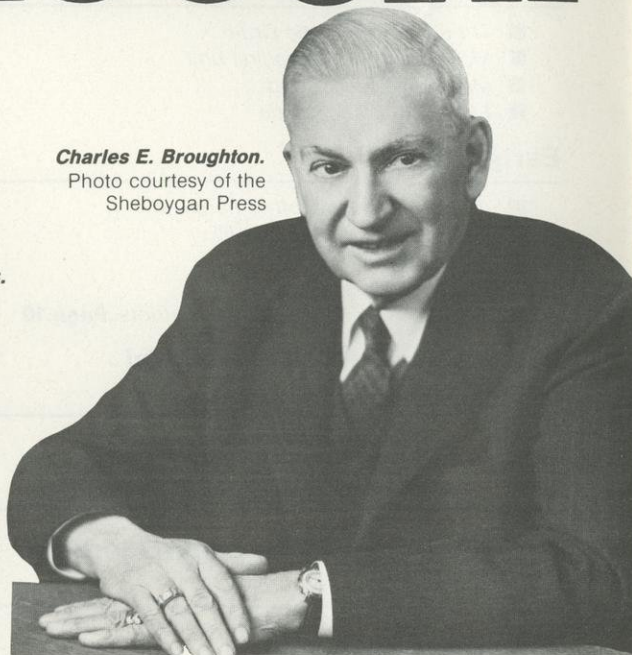


Ray Zillmer.

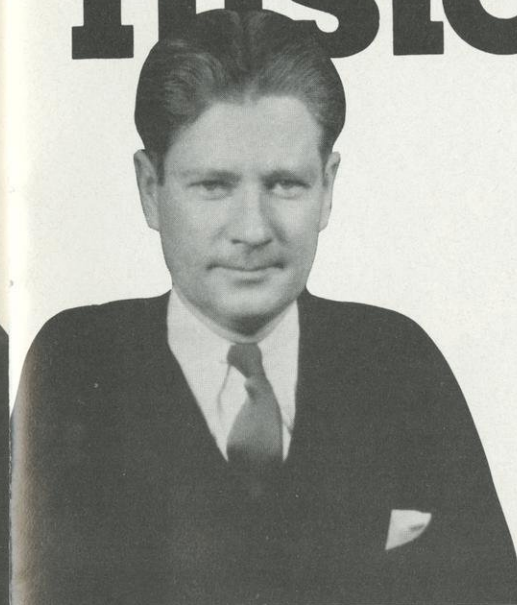
Recent history



Haskell Noyes.



Charles E. Broughton.
Photo courtesy of the
Sheboygan Press



Governor
Philip F. La Follette.

From the Sheboygan Press, March 23, 1936:

MOON LAKE PROPERTY BECOMES THE FIRST UNIT OF NEW STATE PARK

"Seed that was sown in 1926 when Moon Lake was purchased by a group of Milwaukee gentlemen, interested as Izaak Waltonians, has reached fruition in a state park in southeastern Wisconsin.

"Saturday the purchase of the first unit was authorized by Governor La Follette when he affixed his signature approving the Conservation Commission's purchase of 842.2 acres in the Kettle Moraine district of Sheboygan and Fond du Lac counties . . .

"On October 12, 1925, after repeated editorials in The Sheboygan Press, a movement was launched at a meeting in the Retlaw Hotel, Fond du Lac, on the part of representatives from Sheboygan, Plymouth, Milwaukee, Kenosha and Fond du Lac for a state park in the Kettle Moraine district. At that meeting the representatives met to consider the advisability of securing about 15,000 acres of land in the kettles of Sheboygan and Fond du Lac counties for a park region and game preserve. A committee was appointed at the Sheboygan county board session to confer with other counties . . .

"On May 27, 1927, a petition containing the names of 821 businessmen of Sheboygan County asked that the park be established . . .

"During the time that William Mauthe, Fond du Lac, was head of the conservation commission options were secured on property in and adjacent to Forest lake, Lake Seven, Crooked Lake and the eastern shores of Long lake, and the Nast forest consisting of 80 acres which lines both sides of the road adjacent to Forest Lake and adjoining the property of the Moon Lake preserve.

"As in all undertakings of this character it takes time, and the fruits of this labor were realized Saturday with the acquiring of the first unit of a state park for southeastern Wisconsin."

The idea for public ownership in the Kettle Moraine probably had its first serious discussion in 1924 after a major flood on the Milwaukee River had destroyed bridges and inundated Milwaukee streets. To help prevent a recurrence, one proposal called for protection of the river's headwaters in the Northern Kettle Moraine. Consequently, four Milwaukee Park Commissioners, E.A. Howards, William Cavanaugh, C.B. Whitnall, and Phelps Wyman looked into the idea. An inspection tour convinced them that the region which now comprises the Kettle Moraine State Forest's Northern Unit should be purchased not only for flood control, but also to preserve its beauty and provide recreation. A state park, less remote than most and close to population centers in southeast Wisconsin, was one of the commission's goals. Later, a group of counties formed the Inter-County Park Association to push the idea. One avid supporter was Charles E. Broughton, editor of the Sheboygan Press, who used his paper and influence to drum up support for a Kettle Moraine State Park.

Eventually, because conservation organizations, various groups, individuals, the press and state and local government all wanted it, in 1927 the Legislature passed a bill calling for creation of a Kettle Moraine State Park. However, no funds were authorized so the Governor vetoed it. A short time later, William Mauthe of Fond du Lac was appointed to the Conservation Commission (now the Natural Resources Board). Mauthe was enthusiastic about a Kettle Moraine Park and this gave the idea new life.

About a year before the Governor's veto, in 1926, the Izaak Walton League had purchased 800 acres around Moon Lake in the Northern Kettle Moraine and established a wildlife refuge. The property cost \$40,000. Ten years later, on July 31, 1936, the Milwaukee Chapter of the League donated this land to the Conservation Commission with the expressed purpose of creating a Kettle Moraine State Park. The next year the Legislature followed through. It passed a new bill appropriating \$75,000 for acquisition and development of state forest lands, especially in southeastern Wisconsin. This time the Governor signed it.

Initially, three units were planned, but only two materialized. The Northern Unit of the Kettle Moraine State Forest was to stretch through Fond du Lac, Sheboygan and Washington counties, while the Southern Unit would span Waukesha, Walworth and Jefferson counties. Both became a reality, but the White River Unit, which was to cover parts of Walworth and Kenosha counties, never did because of funding limitations.

The following was taken from E.A. Howards' Recollections on Development of the Milwaukee County Park System:

Milwaukee River flood

"In August, 1924, there occurred the greatest recorded flood on the Milwaukee River. The rain was especially heavy in Washington and Fond du Lac counties, and about thirty bridges were washed out. Water of the Milwaukee River came over Silver Spring Road. Boats were crossing Green Bay Road at Lincoln Creek.

"As a result of this flood, much discussion arose as to remedies — the same as is true today, forty-four years later. Some advocated construction of flood control basins and others the acquisition of flood lands by the public. A channel from the river to the lake, a short distance north of Thiensville, was also proposed.

"Of course, the lowlands should have been zoned against buildings or, at best, purchased outright.

"While I was with the State Highway Commission, I often had the opportunity to observe the beauty of the Kettle Moraine area in Fond du Lac, Sheboygan, and Washington counties, and following the 1924 flood I suggested to some of the interested parties that whatever else was done, the headwaters of the Milwaukee River should be preserved in public ownership. It was an area of lakes, springs, and gravel hills. An inspection of it was arranged, and William Cavanaugh, C. B. Whitnall, Phelps Wyman, and I made a trip over the area. The conclusion was that something should be done to preserve the area in public domain . . . I was directed to get such a movement organized.

"Inasmuch as I had only recently been with the State Highway Commission District covering the nine southeastern counties, and was quite well acquainted with leaders in these counties, it was no trouble to sponsor a meeting which was held that winter at the Wisconsin Hotel. At this meeting a Southeastern Inter-County Park Association was formed. Charles Broughton, Editor of the Sheboygan Press was at the meeting and became very interested. He invited the group to meet in Sheboygan in the summer of 1925, to inspect the areas on the ground. Mr. Broughton provided a dinner at the Sheboygan Elks Club, at his expense. The inspection trip was made in July 1925."

Letter from MacKenzie

"Nearly every family can afford the transportation necessary to take them to one of the lakes in the Kettle Moraine district and if this area were to be thrown open in the proper manner to the public, hundreds of families from the southeastern part of the state would have opportunities to spend many of their week-ends in the open.

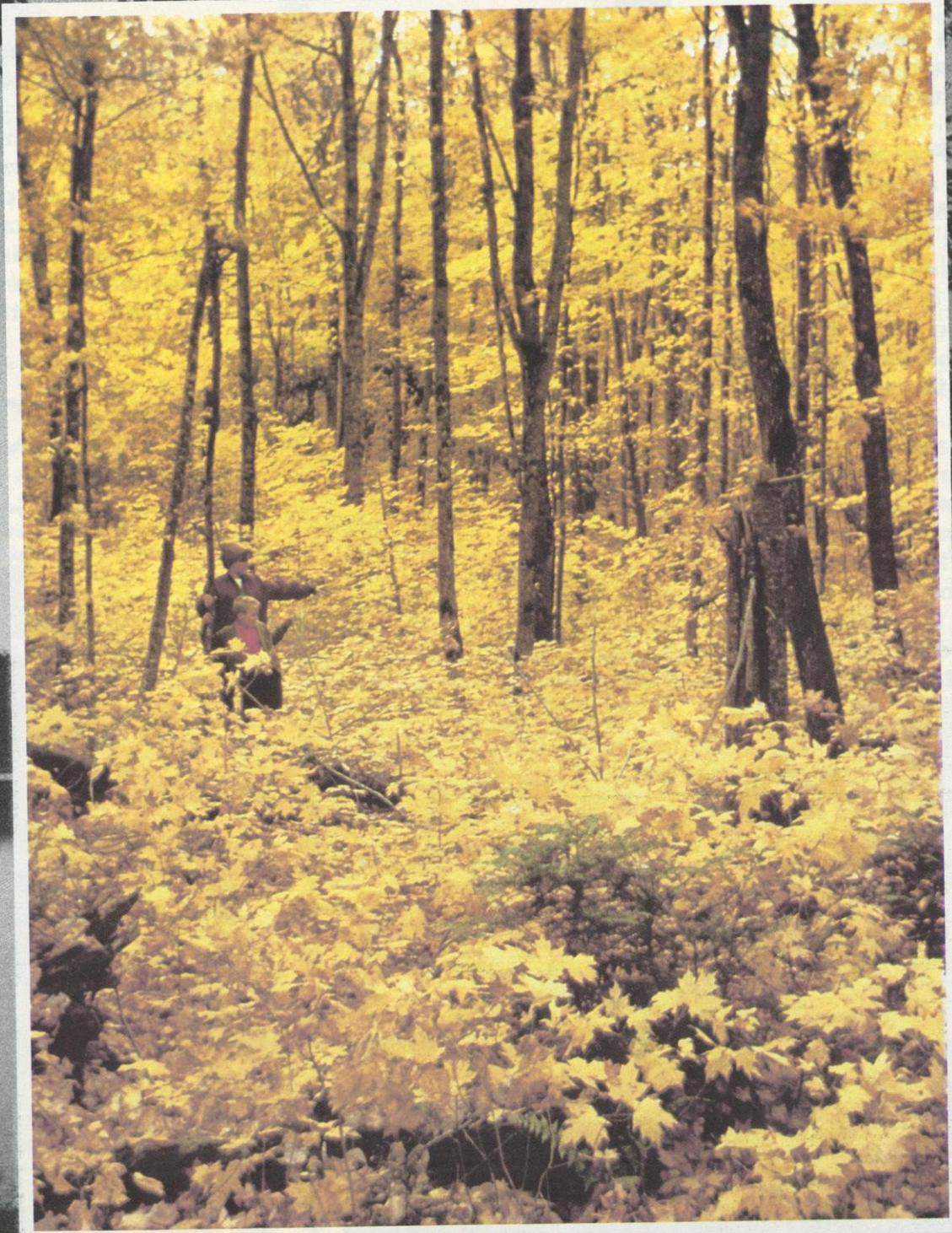
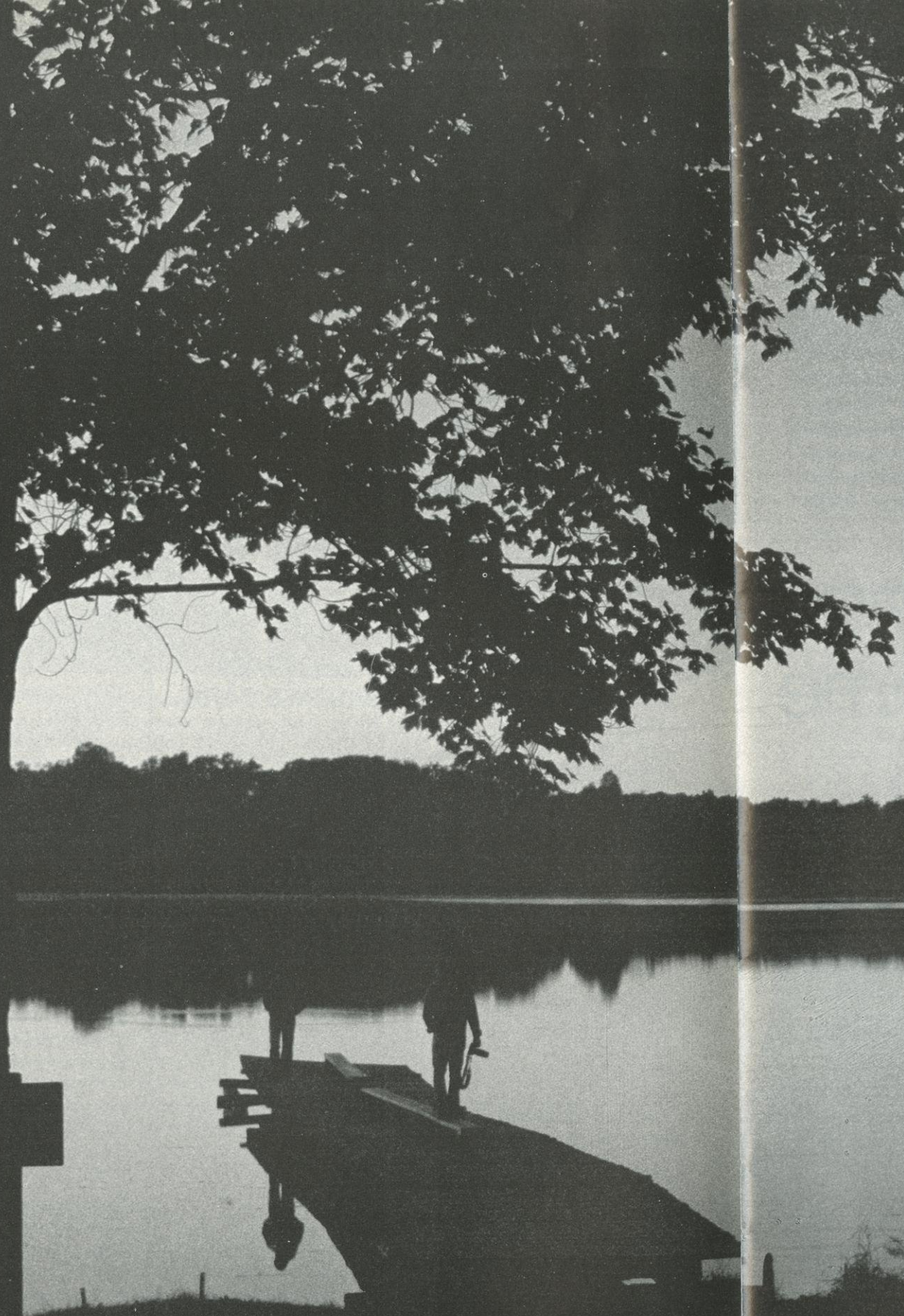
"There is no question that it is the most promising area, which combines recreational and forestry uses in the heavily populated part of the state, where, at the present time, the state does not have park facilities or similar advantages adequate to meet the growing demand for such services.

"The heart of this area is approximately fifty miles from Milwaukee and a much shorter distance from Sheboygan, Fond du Lac and Oshkosh. The total district covers about 30,000 acres and is decidedly picturesque. Many farms located there have been abandoned and more should be because of poor production. Seven nice lakes are located within the moraine.

"I would say that the 842.2 acres now purchased includes about 100 acres of water and the rest is made up of marsh and high land. Besides the two lakes there are additional water facilities in that the Milwaukee river flows through the area. The property now holds a cottage and nine buildings and a considerable amount of game farm fencing. The Milwaukee chapter (of the Izaak Walton League) is said to have originally paid \$40,000 for the land and in addition has spent \$10,000 in improvements."



Former Chief Warden H.W. MacKenzie was director of the Conservation Department when the Kettle Moraine State Forest was established.



Background: Mauthe Lake recreation area, formerly part of the Izaak Walton League's Moon Lake preserve. It was renamed for William Mauthe, head of the Conservation Commission when the League gave its property to the state as a nucleus for the Kettle Moraine State Forest.

Photo by Roger Reif

Inset: The Kettle Moraine State Forest fulfills founders' plans for combined recreational and forestry uses.

Early history

The name Kettle Moraine was adopted only recently and is the last in a series of other names that were used to describe this region.

An old French map drawn up in the 1820s identified a series of hills in this area as the *Smokey Mountains*. Even today, especially viewing it from the west side, a haze sometimes obscures the moraine, giving the appearance of smoke.

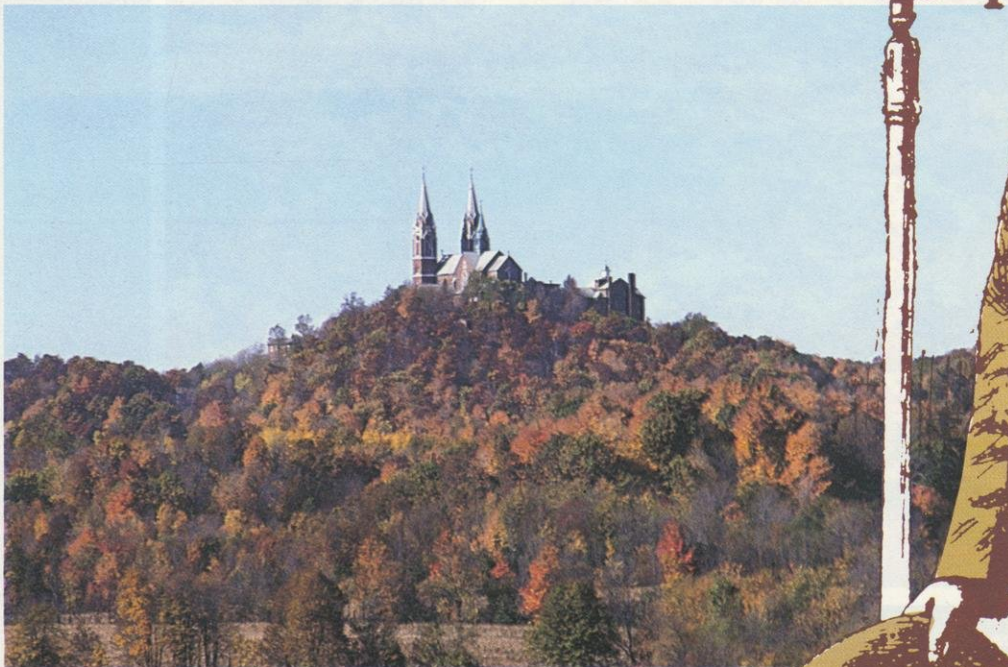
Later, in the 1830s and 1840s, settlers called it the *Bluffs*, referring to the steep moraine on the west side. Bluff Creek in the Southern Unit and Bluff Road retain this name today.

Next came the name *Potash Kettle Range*. T.C. Chamberlin, a state geologist in the 1870's wrote down the reason. The area's "gigantic hummocks and hollows caught the imagination of the pioneers and called up the image of the great caldrons they used for boiling down ash lye into potash cakes. Some of these kettles seemed to be set in

place and many or more were turned upside down. Here arose the homely but suggestive name — *Potash Kettle Range*."

Chamberlin himself tried to be more accurate. He used the name *Kettle Interlobate Moraine*. In time, however, the word "interlobate" was dropped and *Kettle Moraine* is the final result. Chamberlin was the first geologist to study Kettle Moraine landforms in detail and associate their creation with glaciers.

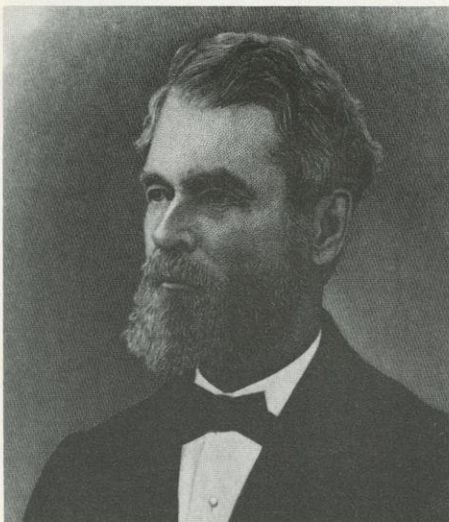
A Moraine by any other name



Holy Hill, site of a Catholic monastery, is the highest point in the Kettle Moraine.

Photo by Ron Kurowski





Naturalist Increase A. Lapham described Kettle Moraine flora and fauna in an 1846 publication. His experiments at Lapham Peak helped lead to creation of the National Weather Service. Portrait courtesy of the State Historical Society of Wisconsin

The first maps

In 1835 government surveyors, including a man named John Brink, started mapping the Kettle Moraine. It was the first time anyone actually wrote in detail about the area or even drew maps of it. A survey party usually consisted of two chain men, an ax man, a cook, a pack man and a surveyor. They mapped prairies, marshes, rivers, lakes, major Indian trails and other important landmarks.

Information collected was used by settlers to learn the lay of the land, to find specific places and to legally record their property. At that time the federal government sold Kettle Moraine lands for \$1.25 per acre. People from the New England states, Ireland, Wales and England were among the first settlers in the Southern Unit, while the Northern Unit was settled by the Germans, Irish and Scotch.

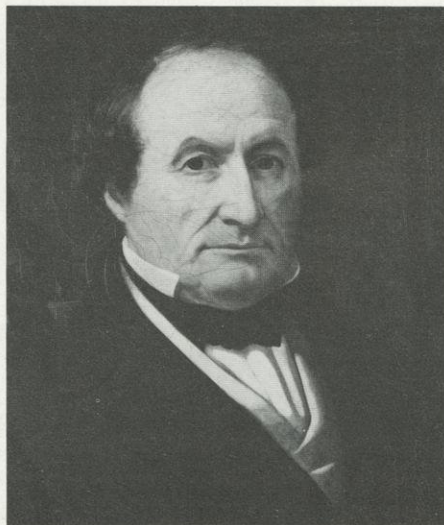
The naturalist Increase A. Lapham drew maps of much of southeastern Wisconsin in the early 1840s, including the Kettle Moraine. He not only outlined prairies, marshes, Indian trails, lakes and rivers, but in his book, *Wisconsin - Its Geography, Topography, History, Geology and Mineralogy*, published in 1846, he also described plants and animals of the region.

The fur trade

The Northwest Fur Company and the American Fur Company operated in the Kettle Moraine during most of the 18th & 19th centuries. Known trading posts were at Mukwonago, Waukesha, Oconomowoc and a site near Lake Koshkonong. So far, none have been found inside Kettle Moraine State Forest boundaries.

Fur traders risked their lives to swap cloth, beads, axes, hoes, guns, knives, jewelry and other items for beaver, muskrat, otter and mink skins. Traders might spend the winter with Indians, build a cabin near a summer camp and do business there, or meet Indians at a central location in spring to pick up furs accumulated over winter.

Some of the well known individuals included Sieur Morin, Pierre La Porte, Thiebeau, Jacques Vieau, Jean Baptist Le Tendre, Solomon Juneau and Amable Vieau.



Solomon Juneau, a founder of Milwaukee, probably passed through the Kettle Moraine region with an 1835 expedition. Portrait by S.M. Brookes; courtesy of the State Historical Society of Wisconsin

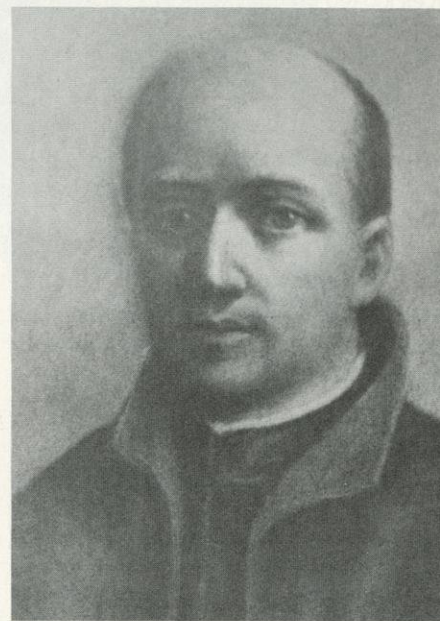
Solomon Juneau

In December of 1835, Solomon Juneau and several others went on a search for water-power sites guided by Le Tendre, a voyageur, trader, and interpreter. Their expedition probably included the Kettle Moraine because they eventually camped on the present-day site of Whitewater along the Whitewater River. The next day they traveled north and camped on the Bark River near present-day Hebron. There they found 10 or 12 large dug-out, black walnut canoes which they thought might have been used by Black Hawk in his escape from the army in the Black Hawk War of 1832.

Pere Marquette at Holy Hill?

The first visit to the Kettle Moraine by a European is thought to have occurred in the late 17th century. It is known that Jesuit missionaries, including Father Jacques Marquette, traveled the west shore of Lake Michigan in the 17th century and erected crosses on top of high hills. Settlers who entered the region around Holy Hill in the 1840s were told by Indians that long ago white men came from Lake Michigan and erected a cross there.

Chief Kewaskum of the Potawatomi stated "I have heard my father tell that white men came there many years ago and placed a cross on top of it (Holy Hill). I can't tell how many years ago it was, but my father said his grandfather was there at the time it was done." In addition, Chief Monches, leader of the Menomonies, was proud to tell that his tribe also knew white men from Lake Michigan had come many years before to plant a cross at the summit. It is possible, therefore, that the white man was Father Jacques Marquette, although that cannot yet be proven.



Pere Marquette, a Jesuit missionary, may have visited the Kettle Moraine region as early as the 17th century. Portrait courtesy of the State Historical Society of Wisconsin

◀ When surveyor John Brink began mapping the area in 1835, the federal government sold Kettle Moraine land for \$1.25 per acre.

General Atkinson's Palmyra Patriots: a roster of heroes

Big names in American history slept here—all on the same summer night.

Although the Kettle Moraine has had many visitors since the Wisconsin glacier left 10,000 years ago, it never hosted so many soon-to-be-famous Americans as it did on July 7, 1832. During the Black Hawk Indian War in that year General Henry Atkinson, leading an army of cavalry and infantry of 3,500 troops, was under orders to find and bring back Chief Black Hawk and his 1,000 Sauk and Kickapoo followers.

The morning of July 7th the soldiers camped at Burnt Village, an old Winnebago Indian site located at the juncton of the Whitewater and Bark Rivers. Believing Black Hawk had fled into a huge, almost impassable marsh north of there, Atkinson decided to travel around it and stop close to a place where his troops could ford this big obstacle. Traveling 12 miles east to the edge of the Kettle Moraine, he set up camp. The rest of the army joined him there. One soldier who was present described the scene: "On this evening the whole force got together and camped together for the first time. Our forces looked like they were able to whip all the Indians in the northwest territories."

Atkinson's big encampment is believed to have been located one mile south of Palmyra along Spring Creek near the outlet of Blue Spring Lake. It was a site of historic coincidence. Among the regular and volunteer soldiers in the camp were a number of people who would play very important roles in shaping American history. They included future presidents Abraham Lincoln and Zachary Taylor; Robert Anderson, who would become commander of Fort Sumter during the Civil War; Albert Sidney Johnston, a highly respected Confederate General; Henry Dodge, who would become the first governor of the Wisconsin Territory; William S. Hamilton, son of Alexander Hamilton; Meriwether Lewis Clark, son of William Clark of the famed Lewis and Clark expedition; Winnebago Chief White Crow; and Potawatomi Chief Big Foot.

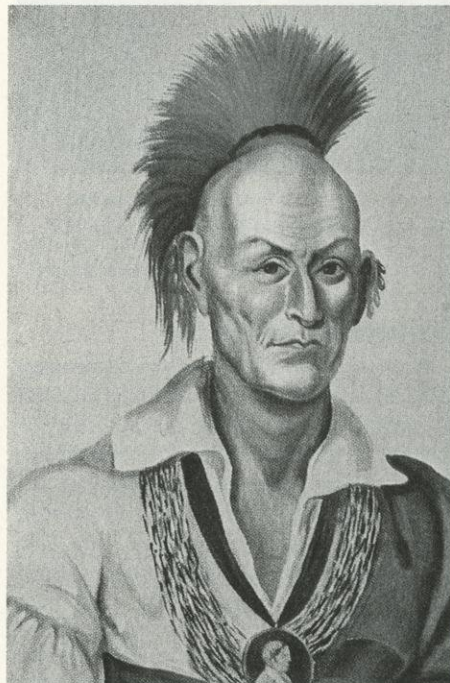
The ford that Atkinson was headed for was probably one-half mile west of the town of Oak Hill, approximately nine miles away from his camp. But knowing a number of brigades were running low on supplies, the general decided to retrace his route back to the mouth of the Bark River (Ft. Atkinson) rather than advance to the ford. He eventually returned again on July 19th, but with a lesser number of troops. By then, the group

of soon-to-be-famous Americans had dispersed. Both times Black Hawk eluded Atkinson in the Kettle Moraine, but later, at the Battle of Bad Axe, the general fulfilled his mission.

The significance of July 7, 1832 only became known later as historians pieced together the story of the Black Hawk Wars and the Kettle Moraine. It is doubtful that such a number of heroes and patriots will ever converge here again, and ironic that when they did, no one knew.

US President Abraham Lincoln was part of the Atkinson encampment.

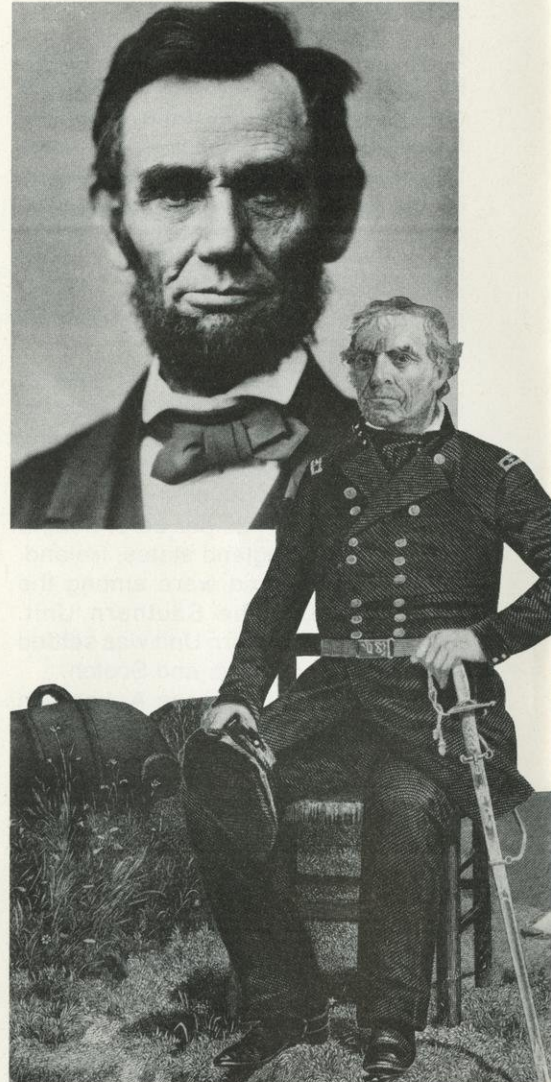
Portrait courtesy of the State Historical Society of Wisconsin



Chief Black Hawk and his 1,000 Sauk and Kickapoo followers eluded pursuers in the Kettle Moraine. From *Hunting a Shadow* by Crawford B. Thayer



General Henry Atkinson, who in 1832 rallied 3,500 soldiers in a vain effort to capture Black Hawk. His company included future presidents, the first governor of Wisconsin, Confederate generals, Indian Chiefs and many famous sons. From *Hunting a Shadow* by Crawford B. Thayer



US President Zachary Taylor was among the roster of heroes. Portrait courtesy of the State Historical Society of Wisconsin

The Ice Age Trail and National Scientific Reserve

Wisconsin's Ice Age National Scientific Reserve was created in 1971 as an "Affiliate Area" of the National Park Service to preserve the state's unique glacial features. Operated and administered by the Department of Natural Resources with guidance and assistance from the federal agency, the Reserve consists of nine separate glacially significant units around the state. Because of its outstanding array of kames, kettles, moraines, eskers, outwash plains and other geological features, the Northern Kettle Moraine State Forest was chosen as one of the units. Regularly scheduled interpretive programs are held at the Henry S. Reuss Ice Age Visitor Center near Dundee.

Other Ice Age Reserve Units include Devil's Lake, Interstate and Mill Bluff State Parks and the Horicon Marsh Wildlife Area. Various interpretive services and exhibits are available at these units as well. The remaining four Ice Age Units are not yet ready for public use.

Eventually linking most of these units will be a National Science Trail — The Ice Age Trail. It will generally follow the terminal moraine across Wisconsin, and when completed be nearly 1,000 miles in length. Two private, non-profit organizations, the Ice Age Park and Trail Foundation, and the Ice Age Trail Council have sponsored its creation through easements, purchases, agreements, and even handshakes. Today about 300 miles have been completed, including segments that link the two Kettle Moraines and Pike Lake.



Congressman Henry S. Reuss at the dedication of the Ice Age Trail. He was a major proponent of the Trail and the National Scientific Reserve.

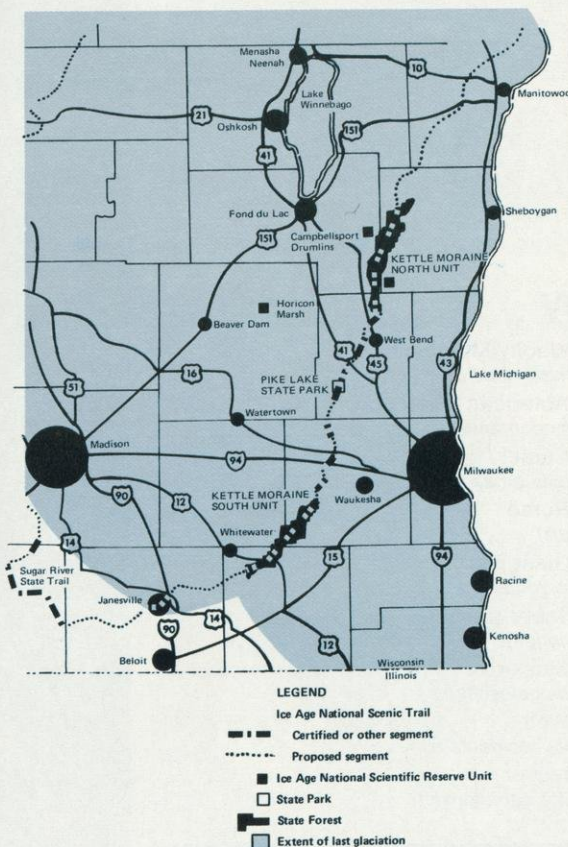
Photo by Roger Reif



The Ice Age Trail generally follows the terminal moraine across Wisconsin.
Photo by Walt Adams



Interpretive programs are scheduled regularly at the Ice Age Center near Dundee. Photo by Roger Reif



For more information inquire at either Kettle Moraine State Forest headquarters, or at the Department of Natural Resources, Bureau of Parks and Recreation, Box 7921, Madison, WI 53707.

Wisconsin's fossil animals from the Pleistocene

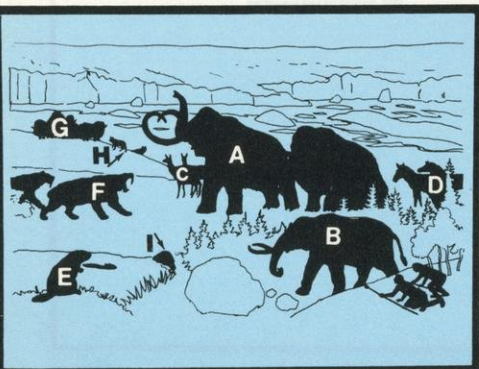
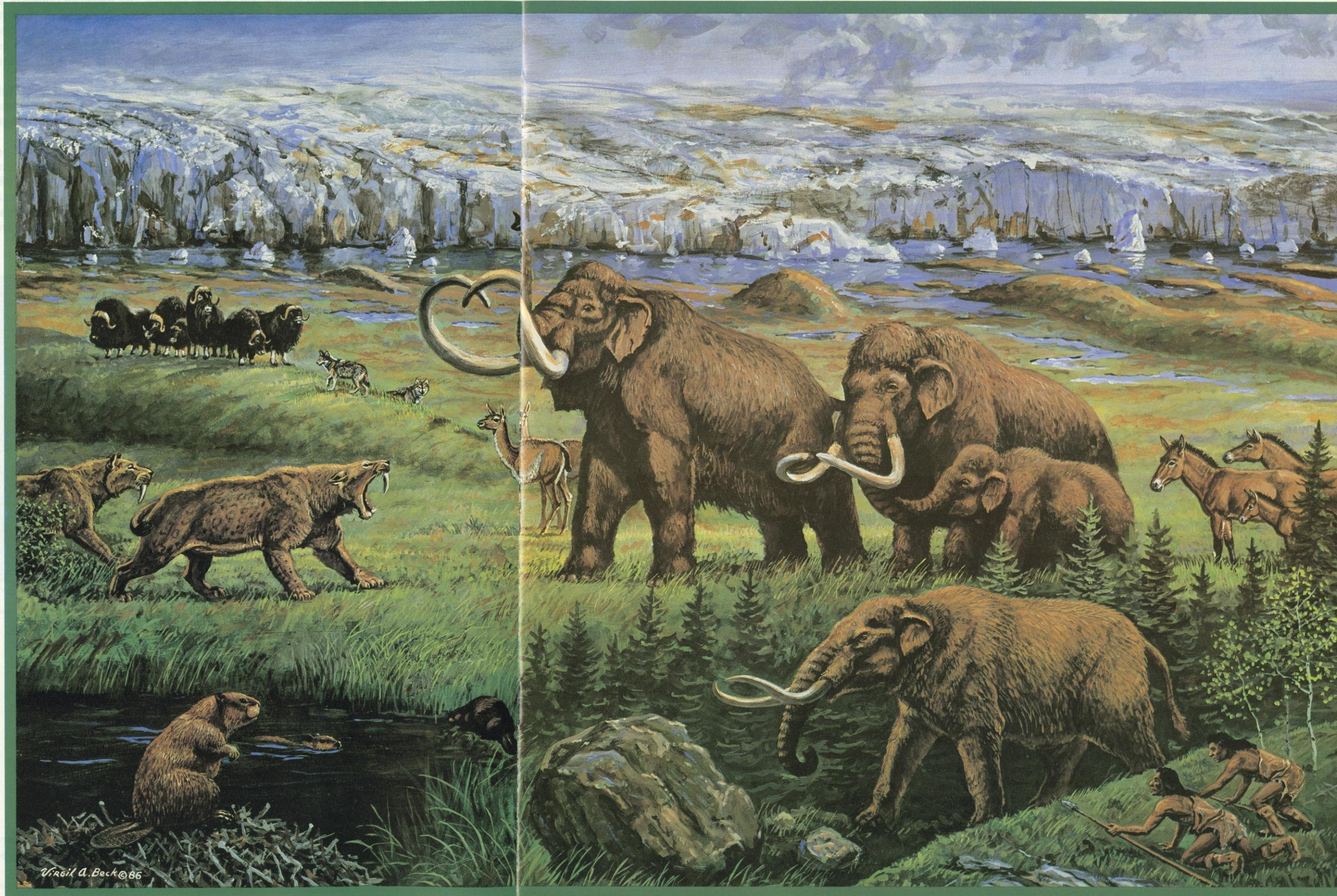
Animals of the Pleistocene.
Painting by Artist/Naturalist
Virgil Beck
Box 66
Stevens Point, WI 54481

John Dallman
UW-Madison
Zoology Museum

Giant 500-pound beaver that couldn't walk on land, woolly mammoths, mastodons and musk ox lived at the edge of the glacier in Wisconsin.

Key

- A—Woolly Mammoth
(*Mammonteus primigenius*)
- B—American Mastodon
(*Mastodon americanus*)
- C—Camel
(*Tanupolama*)
- D—Horse
(*Equus*)
- E—Giant Beaver
(*Castoroides*)
- F—Saber-toothed Tiger
(*Smilodon*)
- G—Musk-ox
(*Ovibos moschatus*)
- H—Wolf
(*Canis occidentalis*)
- I—Beaver
(*Castor canadensis*)



It was bitterly cold and very dry, barren, monotonous and relentlessly harsh on life. These were the conditions on the glacier that had settled itself over the once verdant Wisconsin landscape. The glacier moved south from Canada, once again filling the basins of the Great Lakes to the north and east with ice and ultimately covering three quarters of the present State of Wisconsin. Only the southwestern quarter of the state was spared. Similar glacial events were repeated many times over during the Pleistocene, though just how many times is not certain. The last two advances, named the Woodfordian and the Greatlakean, are well known from geologic evidence and are of interest to us because they were dominating forces in

the distribution of some remarkable animals.

The Woodfordian advance began about 23,000 YBP (shorthand for years before the present) and lasted until 13,000 YBP. The mean annual temperature was about six to eight degrees centigrade lower than the temperature today. This meant that the advancing fingers of ice were not melting away in the south as rapidly as the ice was accumulating in the north. It reached its maximum spread between 15,000 and 13,000 YBP.

Though one imagines a glacier as being extremely inhospitable, it was not totally free of life, particularly along the southern front. There were discernable seasons and the cool short summers were of sufficient dura-

tion to support plants — grasses for the most part and scrub trees such as willow. These plants grew in silt that was wind-transported from off-glacial sources and dropped in sheltered places on the ice. The accumulating layers of silt provided both nutrients to the plants and an insulating barrier between the plants and the ice below. These plants, in turn, nourished hardy, cold-adapted herbivores like the woolly mammoth.

The largest of all animals on the Wisconsin scene, the woolly mammoth stood 13 feet in height and weighed an estimated 12 tons. Its teeth, with many rows of low enamel ridges, tell us the animal was primarily a grazer, an eater of grasses and short green plants. This diet has been corroborated by plant remains found in the alimentary tracts of whole mammoths found frozen in Alaska and Si-

The author checks the inventory of bones from the Neath mastodon.

Photo by Klaus Westphal



beria. Mammoth teeth and a few scattered limb bones have been found in glacial till and outwash in the southern half of Wisconsin, more in the eastern glaciated part than in the west. No specific dates can be provided for any of these finds.

The frequency of mammoth finds suggest that this animal was not rare. Its large size indicates that it not only endured the harshest weather but probably was comfortable in it. Large animals have a small surface area relative to their mass which means they produce a lot of heat internally but have a proportionally smaller skin area across which the heat is radiated. The very large woolly mammoth further conserved heat with a thick layer of subcutaneous fat and a dense coat of hair (more evidence from frozen specimens). Another advantage to being large, again owing to the small ratio of surface area to mass, meant that the woolly mammoth needed less food for its body size than the smaller animals which shared its environment. Large animals are also fairly tolerant of climatic fluctuations. Woolly mammoths continued to survive into the climatic episode that was to follow the glacial one.

Another animal well adapted to the cold is the musk ox. Heavily haired and bulky (700-900 pounds), this animal ranged over the glacier at least during the summer seasons. Unfortunately, only one specimen has been reported for Wisconsin, a much glacially tumbled and barely recognizable skull found in Trempealeau County and now housed at Luther College in Decorah, Iowa.

Also during glacial times, but off the ice to the southwest, a large variety of animal species flourished in climatic regimes that varied from boreal forest to steppe conditions. This was in the driftless area, so called because at least the more recent glacial advances did not cross it. Many of the species found there were refugees from the advancing ice. Fossil remains are scarce, possibly because the rush of waters that came from the melting glacier either carried them away or buried them under many feet of outwash.

One bright spot may portend better things to come. D. L. Rasmussen reported in 1971 on a number of vertebrate species that were recovered from a crevice named Moscow Fissure, near Blanchardville. Over many years, frogs, moles, shrews, bats,

ground squirrels, mice and rabbits either fell or were washed into this crevice. The date for this site is 17,050 YBP plus or minus 1,500. It is interesting that these animals should abound just a few miles southwest of the glacial front.

Around 13,000 YBP, the glacial front began to melt at a faster rate than the ice accumulated to the north and the land previously covered with ice gave way to a new climatic episode. The transition to the new Boreal episode was rapid. Several tree species appeared (identified from pollen in the lake sediments), spruce and fir being dominant along with alder, birch and beech. Climate was cooler than today's and also moister because of the glacial melt water that filled every catch basin.

The woolly mammoth was still on the scene, adapting to the new climatic conditions. Two sites for woolly mammoth have been recorded, one in the village of Lake Mills on the former Richard Stiles farm and the other east of Jefferson on the Durward Maas farm. These farms have in common low areas that have been ditched to facilitate drainage. Remains of the Maas mammoth were scattered by the ditching operation. The important data to be noted is that a substantial number of bones of a single individual were found together and that this animal

was there sometime after 13,000 YBP. The Stiles mammoth clearly walked into what became its burial site because some of the bones were found in the articulated position. The exciting feature about this animal is the date, 9065 YBP, the most recent mammoth yet discovered.

The Boreal episode was a time of yet another elephant type, the mastodon, smaller than the mammoth but still ten feet high with an estimated weight of eight tons. Mastodons were browsers feeding on leaves and tender branches of trees. Only four mastodon skeletons have been reported for Wisconsin but a number of isolated teeth have been discovered in the southern half of the state. The first skeleton was found near Boaz, Richland County in 1897 on what was then the Dosch farm. It lacked many bones and required a large amount of reconstruction but its impressive skeleton is presently on exhibit at the University of Wisconsin Geology Museum, the only mounted specimen in the state. Although a projectile point of Paleo-Indian design was found in the same strata as the Dosch mastodon, there is no direct evidence that this animal fell prey to the human hunters who lost the point. There are only two mastodons in the whole United States where a positive association with humans can be made: one in Wash-

Archeological excavations in marshes present many problems—mud, water and poor footing. Photo by Don Chandler



ington where a bone point penetrated a rib and the other in Michigan where neck and limb bones displayed butchering marks.

Research efforts have lately focused on a site in eastern Dane County near Deerfield on the adjacent farms of Donald Schimelpfenig and John Neath. This area is now a marsh, but 10,000 years ago it was a lake or possibly a meandering stream that sometimes flooded its banks. It was and remains a poorly drained area, though since the year 1900 the area has been ditched from time to time for agriculture. One of these ditching operations turned up a mastodon skull. Teeth that were later discovered on the surface launched excavations that began in the 1960's and still continue.

Skeletons of three mastodons were found here. Two animals, one 15 years of age and the other about 40 (based on tooth eruption sequence), apparently died near the south shore of the lake. Shortly after their death, a flush of water, perhaps from heavy rains, carried each skeleton into the lake and dropped the bones four and one half feet to the bottom. The excavations of the two skeletons showed that these mastodons died and were transported under identical conditions but their deaths occurred 200 years apart, one about 9400 YBP and the other about 9600.

At first the inventory of bones was not complete for either skeleton with the same set of bones missing from each. These were the large, angular and heavy ones, the pelvis, sacrum and femurs. Mastodon femurs are about three feet long and weigh about 70 pounds and may not have been easily moved by water. As the excavation progressed, dips were noticed in the wall profile along the east side. These dips seemed to represent old water channels that entered the lake. Digging "upstream" from the bone deposit, our excavation team was finally able to locate a pelvis and a sacrum of one animal.

During the clean-up phase of the excavation, one of our crew explored an adjacent ditch in a casual effort to occupy some free time. Using a probe, he found a third mastodon. The recovery of this skeleton was more challenging owing to its depth of eight to 10 feet below the surface. Under the skull was a spruce trunk dated at 13,000 YBP. Above it were hundreds of sticks accumulated by beavers for their winter food supply. These were dated

10,000 YBP. This third mastodon was a 28-year-old female that clearly walked to this spot and then died. Perhaps ill, she lost her balance and tipped over on her left side. It may have been a coincidence but the ribs on that side were broken, perhaps from a fight. At any rate, weakness overcame her and she dropped on her left side. There were no signs that scavengers had fed on the carcass nor were there any signs of human activity.

Since that time, a third molar of a fourth animal has been found and the search continues to locate the rest of the animal. Though these mastodons are spectacular animals and exciting to find, they raise some questions. Where are all the other animals that occupied this area—the turtles, fish, marsh birds and others that came to feed and drink in this sheltered lake? One beaver humerus and two muskrat skulls are the only other finds.

A layer of wood fragments lies between the peat and the marl below. Does this layer represent a time of forest expansion across the lake bottom about 10 or 11-thousand years ago when the Greatlakean glacier sucked away the water during its modest advance into northern and eastern Wisconsin?

Of all the fossil discoveries in Wisconsin, none arouses more interest than the giant beaver. Another animal of boreal times, the giant beaver lived side by side with modern beaver. They were easy to tell apart; a modern beaver was three to four feet in length and probably weighed from 40 to 60 pounds; the giant beaver was seven feet long and weighed an estimated 500 pounds. There is no evidence that giant beaver emulated their modern cousins by building dams or houses. Their extremely small legs compared to their giant body size militated against their leaving the water except perhaps to sun themselves at the lake edge. Being water bound, giant beaver probably exploited such water plants as cattail for food. Examination of endocranial casts show that the animal had a highly developed sense of smell, but not such good eyesight, when compared to modern beaver.

The greatest amount of giant beaver material came from a pond dredged environment? There is no reason to assume that the southern boundary of the Boreal zone retreated in an even east-west line. Surely there were enclaves of Boreal habitat in the low areas or in the river valleys that

were left behind by the retreating Boreal zone. Animals that unknowingly remained behind to live in these spots soon found their island-like refuge diminishing in circumference until, when the plot disappeared altogether, they were left in an unfavorable climate. If the warmer and drier environment did not directly kill off the survivors, the final blow was probably delivered by the deleterious effect of elevated temperatures on reproductive organs.

Another possibility for the mastodon's extinction lies in their great weight and the unequal distribution of that weight over their limbs. Mastodons had long, horizontally oriented heads with enormous forward-projecting tusks. This design meant that a disproportionate amount of body weight was carried over the front legs. Enormous forces must have been concentrated in the leg by the simple act of taking a step, a notion that is fortified by the observation of a large number of broken forelegs in mastodon skeletons. Curiously, many of the mastodons recovered from these breaks though the rotation of the forelegs during life was clearly impaired by bony callouses where they healed. It is not unlikely that the mastodon's own design would have ultimately pushed it into extinction if the changing environment hadn't pushed first.

The fate of the giant beaver seems also to have depended on the change in climate. Lakes and streams that supported it began to disappear during the dry climatic episode. As the waters became more shallow, the remaining animals may have fallen victim to predators that would not have dared to approach in deeper water.

Some of the fossil materials discussed in this article may be seen at the Ice Age National Park Visitors Center near Dundee; the Kettle Moraine State Park, Southern Area Headquarters near Eagle; Interstate Park near St. Croix Falls; the U-W Madison Zoological Museum and the UW-Madison Geology Museum.

For reading on the Pleistocene environment and the animals that lived then, see:

Kurten, Bjorn and Elaine Anderson, 1980, Pleistocene Mammals of North America: Columbia University Press.

West, Robert M. and John E. Dallman, 1980, Late Pleistocene and Holocene Vertebrate Fossil Record of Wisconsin: Geoscience Wisconsin, (Vol. 4, p.25-4)

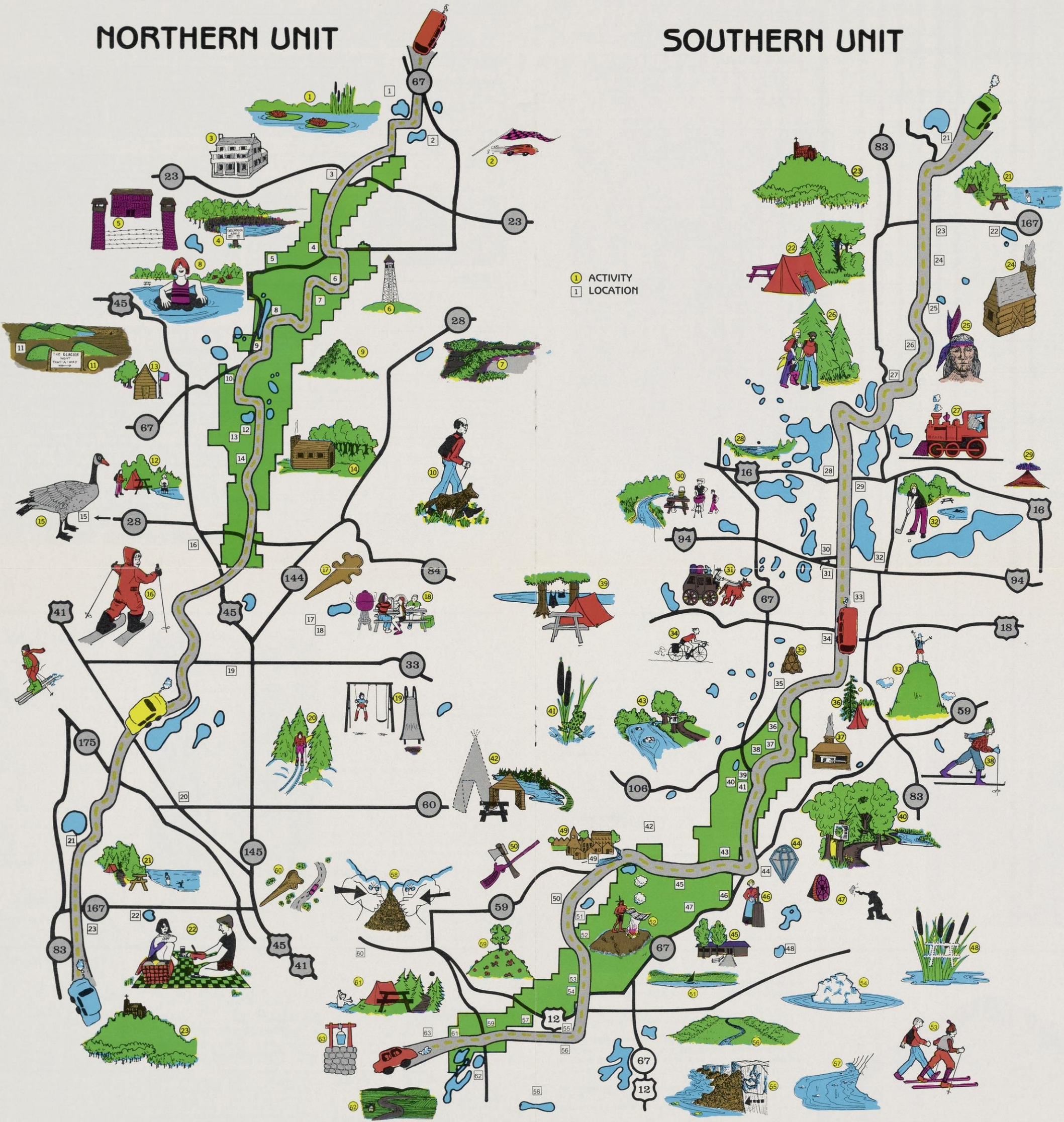
Pull out for map;
Key on reverse side.

Kettle Moraine Scenic Drive

Map by Jeanne Gomoll

NORTHERN UNIT

SOUTHERN UNIT



Scuppernong springs

In a small valley surrounded by wooded hills lie the headwaters of the Scuppernong River where a number of bubbling springs, still visible today, start the stream on its way. At one point a sawmill was built in the valley and later, in 1870, a cheese factory that produced 500 pounds of cheese daily.

The area became famous in 1870 when Talbot C. Dousman developed what, at that time, was considered the finest and largest trout hatchery in the United States. It consisted of several wooden flumes 150 feet long, graveled spawning races, a hatchery house and a small feed mill used to cook beef liver fed to the trout.

Later, Dousman turned the cheese factory into an inn (The Scuppernong Hotel) that contained about 20 rooms and featured trout dinners at 75 cents a meal.

Many people from the surrounding towns as well as other states visited the inn and eventually walkways were constructed along the flumes so visitors could see the trout. In 1880 an estimated 1½-million fish were raised there.

41 Glacial lake bed

On Highway 67, 3 miles north of the intersection with 59.

Meltwater from the glacial ice collected here and formed a huge post-glacial lake that once was 30 to 40 feet deep. This section of our forest has always been referred to as the Scuppernong Area, which is an Indian word meaning the "wet swampy lands."

42 Carlin Weld County Park

North 1.8 miles from intersection of Highway 59 and County H.

A former Indian campsite, now a Jefferson County Park with picnic sites, shelter house, ponds and hiking trails.

43 Paradise Spring Nature Area

North four-tenths miles from intersection of Highway 59 and County N.

A half-mile paved trail featuring a large spring and trout pond. Seventeen labeled stops describe the interesting natural history of this area.

Paradise Springs

A "Gateway to a Healthful and Beautiful Vacation" was how one brochure described Paradise Springs. It flowed at the rate of 30,000 gallons per hour and although it is still known as Paradise Springs, it has also been called Le Fevre Springs, Minnehaha Springs, and Eagle Rock Springs.

Over the years the area has been used for picnics, Fourth of July celebrations, trout fishing, a playground for the wealthy, a commercial resort, and a bottling plant that sold spring water under such names as Eagle Rock Spring, Natural Spring Water, and Lullaby Baby Water.

44 Eagle diamond

Downtown Eagle.

The first diamond to be discovered in Wisconsin was found in Eagle in 1876. In the center of town an historical marker commemorates the event.

45 Kettle Moraine Visitor Center

On Highway 59, 2.8 miles east of Palmyra. Includes the forest headquarters, a natural history museum, nature trail, rest rooms, forest information, and picnic area.

46 Old World Wisconsin

On Highway 67, 1.3 miles south of the intersection with Highway 59.

The Wisconsin Historical Society's outdoor museum depicting the various life styles and cultures of the different ethnic groups that settled Wisconsin.

47 McMiller Rifle Range and Cross Country Ski Area

South 3.2 miles from intersection of Highways 59 and 67, off County NN.

A rifle range and a five-looped cross country ski trail are available in season.

48 Mukwonago River Unit, Kettle Moraine State Forest

Undeveloped to date with no access roads. Generally located inside the perimeter of Nature, Bluff and Eagle Rds.

A future park here will protect the large wetlands and headwaters of the Mukwonago River.

49 Palmyra

On County H, 1.4 miles north of the intersection with Lowland Rd.

During the 1880s, this town became famous for its mineral spring, which attracted many people from throughout the country.

The stone elephant of Palmyra (elephant rock)

"Take a ride down that old winding Indian trail to the old stone elephant, old jumbo, mammoth boulder of those rockies, that freak of nature." This was part of the pitch William Congdon used to entice tourists around Blue Spring on his excursions. In the early 1900s the round trip by a horse-drawn surrey would take an hour and cost 25 cents. The attraction was a huge granite boulder 39-feet in circumference called the stone elephant. It can still be seen today.

The spot is believed to have been held sacred by the Potawatomi who are thought to have used it for sacrificial ceremonies.

50 General Henry Atkinson's encampment of July 7th, 1832

Three tenths of a mile north of the intersection of County H and Lowland Rd. Look to the west of this point.

In 1832, an army of 3,500 troops searching for Black Hawk encamped in this general vicinity.

51 Blue Spring Lake

On County H, nine-tenths miles north of the intersection with Young Rd.

Once the site of a huge sky-blue colored flowing spring that attracted many visitors. Unfortunately in 1927 it was dammed to create a lake.

52 Bald Bluff Dry Prairie Natural Area and scenic overlook

One-tenth of a mile north of the intersection of County H and Young Road.

Currently undeveloped, this is a high point that probably was used as an Indian signal hill and council grounds.

53 John Muir and Nordic Hiking and Cross-Country Ski Trails

On County H, 1.5 miles north of the intersection with Highway 12.

Two of the longest trails in the forest, 10 miles and 7.5 miles respectively.

54 Kettle

On County H, seven-tenths miles north of the intersection with Highway 12.

A depression in the ground formed by the melting of an ice block(s) that was either buried or partially buried by glacial drift.

55 Glacial spillway

North of the intersection of Kettle Moraine Rd. and County H.

Small valley created by glacial ice when meltwaters cut across the outwash plain.

56 Glacial outwash plain

Along much of the Kettle Moraine Rd. This broad flat area was created when the finer material was washed out of the glacier by running water.

57 Kettle interlobate moraine

Can be seen to the north of Kettle Moraine Rd.

A good view of the 120 mile moraine that was formed along the line of junction between two adjacent glacial lobes.

58 Elkhorn recessional moraine

Distant hills south of Kettle Moraine Rd.

This wooded ridge or moraine marks where there was a significant halt or pause in the final retreat of the Lake Michigan lobe.

59 Lone Tree Bluff

View of this hill can be seen to the northwest one-half mile from the intersection of Kettle Moraine Rd. and Esterly Rd.

A high point in the Kettle Moraine from which, in 1837, James Holden, an early settler, first viewed and named the Heart Prairie, based on its shape.

60 Whitewater effigy mounds

Located at the western end of Wildwood Rd. in the City of Whitewater.

There are 12 mounds in this city park believed to have been built by a prehistoric Indian culture.

61 Whitewater Lake Recreational Area

On Kettle Moraine Rd. one mile west of the intersection with County P.

Camping, picnicking, swimming, and a nature trail.

62 Esker

A half mile south of the intersection of Kettle Moraine Rd. and State Park Rd.

A narrow winding ridge of gravel and sand deposits laid down by a glacial stream during the ice age.

63 Artesian well

North two-tenths mile from the intersection of Engle Rd. and Clover Valley Rd.

Hand dug in 1895, cold drinking water can still be obtained from this flowing well.



Blue Spring

Blue Spring, about a mile south of Palmyra, was probably the largest spring in the Kettle Moraine. It was approximately 20 feet deep, 50 feet wide and flowed at a rate of more than two million gallons per day! The water was sky-blue in color and so crystal clear one could see the bubbling sands below.

An Indian legend said that the water's sky-blue color came from the death of a young Indian girl grieving over her lost twin sister. In her search for the twin, she happened upon her own reflection in the clear spring, mistook it for her sister, and, wanting to be reunited, threw herself in, but was never seen again. The legend says from that moment on the spring assumed its beautiful sky-blue color.

Known by other names such as Big Spring, Aurelian and the Great Geyser, in 1874 the owner, August Arndt developed the area as a tourist attraction. Arndt purchased a number of colorful surreys to transport people from Palmyra to the spring and built a raised boardwalk to it through the marsh. On Sundays and holidays people had to wait in line to get a look. Refreshments and souvenirs, including small bottles of sand found at the bottom of the spring, were sold nearby.

Blue Spring continued to be visited by many people, but it all ended in 1927 when a dam was built to form a lake.

Kettle Moraine Drive

To help visitors enjoy the beauty, variety and geology of this vast area, the Wisconsin Bureau of Parks and Recreation has developed Kettle Moraine Scenic Drive. The drive connects Southern and Northern Units of the State Forest and is identified by green acorn-shaped signs.

Motorists can start at any point along the route using the accompanying map. The drive is especially recommended in early and middle October because of the beautiful array of colors on the hillsides. A number of features of interest to users of the route, such as historical sites, glacial forms, recreational areas and plant and animal communities have been identified. Some places are located a short distance off the scenic drive but are included for those who wish to explore further.

A number of listed sites do not have formal pull off-areas, so please use caution when pulling off and on the road to stop or start, especially on the hills and curves.

Additional detailed maps and information can be obtained from state park and forest facilities along this route.

Pull out for map;
Key on reverse side.

Kettle

Map by Jeanne Gomoll

KETTLE MORaine STATE FOREST GENERAL INFORMATION

Fee—A vehicle admission sticker is required when visiting either the Northern or the Southern Units. Daily or annual stickers may be purchased on arrival.

Best Time to Visit—Summer is the most popular time for picnicking, camping and swimming. Hiking is best in spring and fall when biting insects are not so numerous. Weather permitting, cross-country skiing usually runs from the middle of December to the end of February.

Nature Interpretation—Nature hikes and evening programs are presented free during the camping season from April thru October. Schedules are posted on campground bulletin boards and at the Visitor Center. As time permits, naturalists, upon request, present off-property programs about the Kettle Moraine and Wisconsin's natural resources to schools and civic organizations.

Horse and Snowmobile Trails—These uses are restricted to designated trails. Special campgrounds with stable facilities are available at both units where riders can stay overnight with their own horses. Horses can be rented from nearby stables.

Fishing—There is excellent fishing for warmwater species in the many small lakes and anglers can catch trout in some of the streams. A license is required. Information about these areas and regulations is available at the visitor centers.

Hunting—Excellent hunting opportunities exist for small game, waterfowl and deer. Hunting is not allowed in picnic areas, campgrounds, nature study areas and other restricted locations. Non-game species such as blackbirds, sparrows, and chipmunks cannot be hunted. If in doubt please contact a visitor center. A hunting license is required.

SOUTHERN UNIT

Location—Spans the southeastern corner of Wisconsin and covers parts of Waukesha, Jefferson, and Walworth counties.

Access—State highways 12, 59, and 67 all lead to the Southern Unit of the Kettle Moraine State Forest.

Visitor Center—Located on Highway 59, three miles west of Eagle. Open year round, on weekdays from 7:45AM to 4:30PM; weekends 9:00AM to 5:00PM. Park stickers, maps and other information may be obtained here. There is a small natural history museum. A free slide-tape program on the region's geology, plants and animals may be seen in the auditorium.

Camping—Four family campgrounds at Ottawa Lake, Pine Woods, LaGrange and Whitewater are available. Only Ottawa Lake has electricity. Backpack camping along the Ice Age Trail is by reservation only. A camping fee is charged.

Hiking—There are four self-guided and labeled nature trails a half mile to a mile in length, four marked hiking trails two to nine miles long plus the 36-mile Ice Age Trail. Maps and information are available at the Visitor Center.

Swimming—Beaches and bathhouses are located at Ottawa and Whitewater lakes.

Other accommodations—The cities of Whitewater, Eagle and Waukesha have motels, grocery stores, service stations and similar facilities. Information on nearby private campgrounds is available at the Visitor Center.

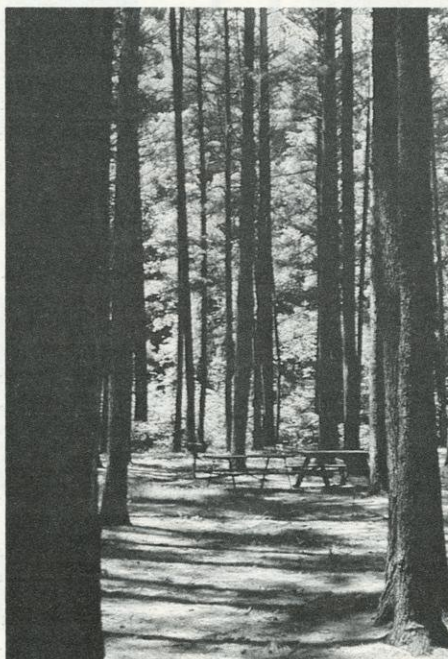
Mailing address and phone—Kettle Moraine State Forest - Southern Unit, S91 W39091 Highway 59, Eagle, WI 53119; 414-594-2135.

SPECIAL FACILITIES:

Paradise Springs Nature Area—A half mile paved trail makes it available to the mobility impaired as well as the general public. Among its attractions are a large flowing spring and a catch-and-release trout pond. For the visually impaired, tape recordings of nature labels along the trail can be obtained at the Visitor Center.

Old World Wisconsin—An outdoor museum operated by the State Historical Society depicts the housing, life styles and culture of the 32 ethnic groups that settled Wisconsin. There is an admission fee.

McMiller Shooting Range—A state-operated facility that includes archery, small-bore, large-bore, pistol and shotgun ranges. A fee is charged.



Picnic Area. DNR Photo

Moraine Scenic Drive

Glacial Features

Kettle—kettle-shaped depressions in the landscape formed by the melting of large blocks of ice buried in glacial drift.

Moraine—unsorted glacial debris deposited at the ice margin. They mark the outermost limit of the glacier and show where it halted in the slow retreat northward.

Kame—cone-shaped hills formed as water fell through vertical shafts in the ice carrying with it debris that was deposited beneath the ice. The debris mounded up like sand falling through an hour glass.

Esker—narrow ridges of sand and gravel formed by streams flowing through tunnels under the ice.

Outwash Plain—a flat expanse of sand and gravel deposited by glacial meltwaters beyond the ice margin.

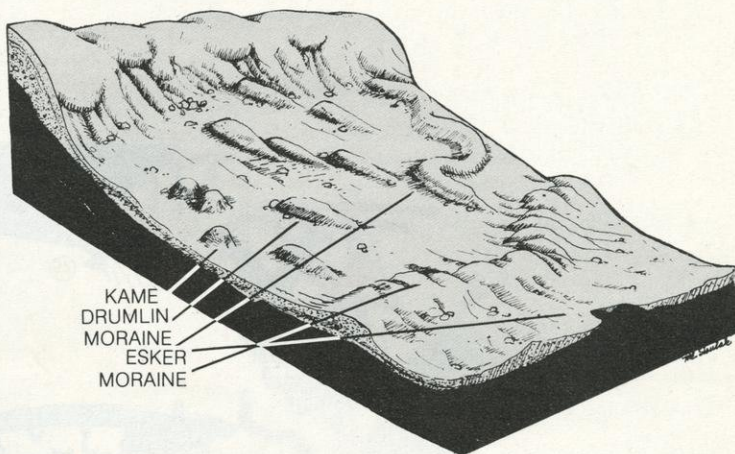


Illustration by Mary Ellen Sisulak from the book *The Geology of Door County*.

NORTHERN UNIT

Location—Runs across Sheboygan, Fond du Lac and parts of Washington county, generally from Glenbeulah in the north, south to Kewaskum near the City of West Bend.

Access—From Milwaukee, use Highway 45. From Fond du Lac, use Highway 23.

Henry S. Reuss Ice Age Visitor Center—Located a half mile south of Dundee on Highway 67. Open year round on weekdays from 8:30AM to 4PM; 9:30 to 5 on weekends and holidays. Depicts the glacial history of the area. Features nature exhibits, films and panoramic views of the forest. Schedules of programs are posted throughout the forest on bulletin boards or call (414)-533-8322.

Camping—Long and Mauthe lakes each have family campgrounds. Backpacking shelters and organized group campsites are available by reservation. Mauthe Lake has some electric hookups. Call or write for more detailed information.

Hiking—The four self-guiding nature trails range in length from a half mile to two miles. There are seven other hiking trails all the way from a half to 29 miles long. In winter, four are groomed for skiing. Maps and information are available at the Visitor Center.

Swimming—Mauthe and Long lakes have supervised swimming beaches.

Other accommodations—The cities of Kewaskum, Fond du Lac, Sheboygan and various small towns in the area have motels, camping supplies, grocery stores, service stations and similar facilities. Information on private campgrounds near the forest is available at the Visitor Center.

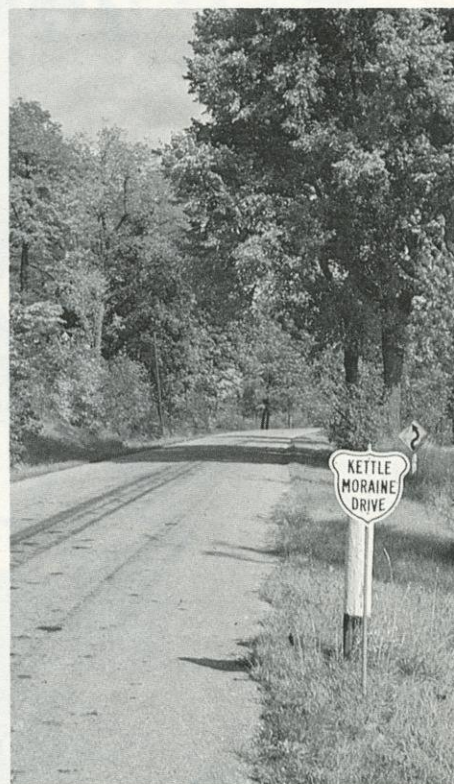
Mailing address and phone—Kettle Moraine State Forest - Northern Unit, Box 410, Campbellsport, WI 53010; 414-626-2116.

SPECIAL FACILITIES

Old Wade House—Operated by the State Historical Society, this living history museum in the Village of Greenbush offers a glimpse of an era when stagecoaches were the chief form of transportation. In addition to a restored country inn, a carriage museum displays a fine collection of horse-drawn vehicles.

Parnell Lookout Tower—Located off County Trunk U, one mile east of Highway 67. Parnell Tower offers a panoramic view over the tree tops of the forest.

Kettle Moraine Scenic Drive.
Photo by Dean Tvedt



Kettle Moraine Drive

1 Sheboygan Marsh County Park

On County J, three miles northwest of Elkhart Lake. Besides offering access to Sheboygan Marsh, this park has picnicking, fishing and limited camping.

2 Road America

On Highway 67 south of Elkhart Lake. This road racing facility is internationally known and attracts many of the best drivers in the world to several major events annually.

3 Old Wade House State Park

Located in the village of Greenbush. A restored stage coach inn that once served travelers between Sheboygan and Fond du Lac.

4 Greenbush Kettle

About three miles south of the Village of Greenbush on Kettle Moraine Dr. An excellent example of a glacial kettle. Parking is available on the west and south sides of the road.

5 Kettle Moraine Correctional Institution

Two and a half miles west of Highway 67 on Forest Dr. A major state penal institution for adult male offenders.

6 Parnell Tower

A quarter mile west of County A on Kettle Moraine Dr. A 50-foot observation tower offering a fine panorama of the Kettle Moraine landscape.

7 Parnell Esker

One mile east of the Long Lake Recreation Area on Kettle Moraine Dr. at Butler Lake Rd. A geological marker here describes this fine example of an esker, one of the longest in the forest.

8 Long Lake Recreation Area

Several miles north of Dundee on Kettle Moraine Dr. Swimming, picnicking, hiking and camping at one of the major recreational areas within the Kettle Moraine State Forest.

9 Dundee Kame

A quarter mile east of Dundee on the south side of Kettle Moraine Dr. One of the finest examples of a kame, world-wide. Photographs of it appear in numerous geological textbooks. Parking is available atop the small knoll on the south side of the road.

10 Henry S. Reuss Ice Age Visitor Center

At the intersection of Highway 67 and County G. A major interpretive center explaining the Ice Age as a geological force responsible for the landscape of much of Wisconsin. An excellent 20-minute film is a must-see for the traveler.

11 Campbellsport Drumlin Area

On County Roads V and Y, three miles northwest of Campbellsport. This is one of the major units of the National Scientific Ice Age Reserve and features beautiful examples of large rolling drumlins.

12 Mauthe Lake Recreational Area

On Kettle Moraine Dr., seven miles north of Kewaskum. Another major recreational area in the Kettle Moraine State Forest.

13 Northern Unit State Forest Headquarters

On County G, 6 1/2 miles north of Kewaskum.

14 Indoor Group Camp

On Youth Camp Road, three-quarters of a mile west of Kettle Moraine Dr. (County F). A natural resource educational facility for school, church and organized adult and youth groups.

15 Horicon Marsh

A State Game Management Area, Federal Wildlife Refuge and major unit of the National Scientific Ice Age Reserve, 25 to 30 miles west of the Kettle Moraine State Forest. The Canada goose migration in fall attracts people from around the world. Excellent viewing is available from Highway 49.

16 Sunburst Ski Area

A commercial skiing facility located one mile south of Kewaskum on Highway 45.

17 Lizard Mound Park

On County A, one mile east of Highway 144. A burial ground of the prehistoric mound-building Indians. Contains excellent effigy mounds.

18 Sandy Knoll County Park

Two miles east of Highway 144 on Wallace Lake Rd. Offers picnicking, swimming, limited camping, hiking and other activities.

19 Ridge Run County Park

One half mile south of Highway 33 at the west edge of West Bend. Offers picnicking, hiking, limited camping, and other facilities.

20 Little Switzerland

A commercial skiing facility located at the intersection of Highways 41 and 60.

21 Pike Lake State Park

Located about five miles east of Hartford off Highway 60. Offers swimming, fishing, picnicking, camping and similar activities.

22 Glacial Hills County Park

On Friess Lake Rd. three miles east of the intersection of County K and Highway 167. Washington County's largest park, located on Friess Lake with facilities for swimming, camping, hiking, and picnicking.

23 Holy Hill

On Hwy 167, .6 mile east of the intersection with County K. Holy Hill is the highest point in the Kettle Moraine and the site of a Catholic monastery that attracts many visitors annually. A large observation deck provides a fantastic view of the beautiful Kettle Moraine countryside.

24 Rustic road

On County K, one mile north of the intersection with County G. A scenic stretch of back road in the town of Erin with a number of old log buildings constructed by early settlers.

25 Monches

On County E, two-and-a-half miles north of the intersection with County VV. A small community named after an Indian chief who lived in this area. An historical marker is in the center of town.

26 Norman Merrill Chester Nature area

Entrance on County E (Center Oak Rd.), five-tenths miles south of Monches. A 200-acre nature reserve with hiking trails owned by the Waukesha County Park System.

27 Kettle Moraine Railway

In North Lake, on Mill Rd., three-tenths miles north of the intersection with Main Street. In season, visitors can enjoy a ride through the Kettle Moraine countryside on an old steam train.

28 Nashotah County Park

On County C, six-tenths miles north of the intersection with Highway 16. A beautiful park on Mud Lake with picnicking and hiking.

29 Watertown Plank Rd.

On Lakeland Rd. (County C), one-tenth mile south of the intersection with Highway 16. Once the site of a road stretching from Milwaukee to Watertown built entirely of white oak planks and completed in 1853.

30 Cushing Memorial Park

On Wells Street in Delafield, four-tenths miles from the intersection with County C. A city park with picnic facilities located along the Bark River.

31 Hawks Inn

On Wells Street in Delafield, one-tenth of a mile west of the intersection with County C. Built in 1846, this stage coach inn became very popular because of its location along the route from Milwaukee to Madison.

32 Naga-waukee County Park

On Highway 83, six-tenths miles north of the intersection with I-94. A large park bordering Nagawicka and Pewaukee Lakes, offering golf, swimming, picnicking and hiking.

33 Lapham Peak Unit—Kettle Moraine State Forest

Undeveloped, but will be located on County C, 1.3 miles north of the intersection with Highway 18. A 500 acre park that will include the highest point in Waukesha County.

Lapham Peak, birthplace of the US Weather Service

Lapham Peak Unit is located in western Waukesha County in the Town of Delafield. A dominant hill affording a spectacular view is its major feature. At 1,233 feet above sea level, it is the highest point in Waukesha County. As many as 16 lakes can be seen from this beautiful scenic overlook.

Formed by the Wisconsin glacier some 10,000 years ago, Lapham Peak has a unique history. Early settlers named the spot Big Hill. Later, it was called Stoney Hill, Prospect Hill, Government Hill and finally in 1916, Lapham Peak, in honor of Increase A. Lapham, a prominent conservationist and scientist in the 1800's. His observation of weather patterns from here led to creation of the National Weather Service.

In 1870, the Signal Corps of the US Army allowed Lapham to set up a series of signal stations between Pike's Peak and Lapham Peak. The stations were used to transmit weather data from west to east, a far cry from today's satellite photography. Blue Mound State Park west of Madison was another such signal station. Meteorological observations were transmitted to Lapham in his Chicago office. His analysis of this information was telegraphed to Great Lakes ports to warn of impending storms.

Lapham Peak continues to be important in communications. In 1948 a radio tower was built on the site for transmissions by the Wisconsin Public Radio network (WHAD) and the Wisconsin State Patrol.

The use of Lapham Peak as a recreational area began in the mid-1800's when Charles Hansen constructed a 20-foot high observation tower and charged visitors a fee to picnic and climb the tower. Eventually, in the 1870s a more elaborate 70-foot tower with a stone foundation and restaurant on one level was constructed. Later, the summit was part of a state tuberculosis sanitarium property (now the Ethan Allen School for Boys). The Legislature transferred the site to the Wisconsin Conservation Department in 1939. The present observation tower was built shortly thereafter.

Comprising less than 1,000 acres, Lapham Peak is small compared to the major units of the Kettle Moraine State Forest. However, its location near Milwaukee and easy accessibility by Interstate Highway adds to its importance as a recreational area. The commanding view from the tower is breathtaking. On a clear day Holy Hill is plainly visible.

Recent acquisitions of additional lands will lead to further recreational development. Hiking and cross country ski trails, picnicking and camping are planned. A magnificent home located near the top of Lapham Peak was donated to the people of Wisconsin by Dr. Paul and Bernice Hausmann. It will be converted to a nature study area. The Glacial Drumlins State Trail will bring bicyclists to within two miles of Lapham Peak and the Ice Age Trail passes right through the area. Users of both will make Lapham Peak a focal point in their travels.

34 Glacial Drumlin Bicycle Trail

Undeveloped, but will be located south of the intersection of Highway 18 and County C. Abandoned railroad grade that will be developed as a bicycle trail between Waukesha and Cottage Grove.

35 Indian trail

Intersection of Counties C and G. At one time an important Indian trail stretched from Lake Koshkonong to Milwaukee with part of it going by this intersection.

36 Pine Woods Campground

On County G, 1.3 miles north of the intersection with County ZZ. Sixty-four campsites located in an old pine plantation.

37 Mackie Group Picnic Area

By reservation only—On County ZZ, nine-tenths miles east of the intersection with Highway 67. An enclosed shelter house with fireplace is available to groups that reserve its use. Site of the former Scuppernong Ranger Station, first headquarters of the Kettle Moraine's Southern Unit.

38 Scuppernong Hiking and Cross-country Ski Trail

On County ZZ, four-tenths miles east of the intersection with Highway 67. Three loop trails. The longest is 6.5 miles.

39 Ottawa Lake Recreational Area

North five-tenths miles from the intersection of Highway 67 and County ZZ. Located next to spring-fed Ottawa Lake is a campground, picnic area, and swimming beach.

Lapham Peak, birthplace of the US Weather Service

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40 Scuppernong Springs Nature Area

North five-tenths miles from the intersection of County ZZ and Highway 67. A 1.5 mile nature trail with 40 labeled stops describing the area's unique history and unusual plant and animal life.

GLACIAL GEOLOGY

of the Kettle Moraine

John W. Attig, Glacial Geologist, Wisconsin Geological and Natural History Survey

Water and ice have worked magic here on a giant scale.

Between about 25,000 and 10,000 years ago the Laurentide Ice Sheet flowed through the Lake Superior and Lake Michigan basins and covered parts of eastern and northern Wisconsin. The margin of the glacier sent out various lobes extending farther south in lowland areas than in adjacent highland areas. In eastern Wisconsin the Green Bay Lobe extended as far south as the Janesville area, and the Lake Michigan Lobe extended into northern Illinois and Indiana.

The Kettle Moraine in eastern Wisconsin is a collection of landforms that developed where the east flank of the Green Bay Lobe merged with the west flank of the Lake Michigan Lobe. They formed a continuous cover of ice that became a slowly widening corridor as the lobes melted back. The two lobes began to melt back between about 18,000 and 15,000 years ago, and the main mass of the glacier had probably receded from the Kettle Moraine by about 13,000 years ago. Masses of stagnant ice persisted after the main mass of the glacier had melted back.

In the southern part of the Kettle Moraine the ice margin stabilized or re-advanced a number of times during the general wasting back of the Green Bay Lobe and Lake Michigan Lobe. Each time the margin of one of the lobes stabilized for a period of time, the continued flow of ice carried rock debris toward the margin, where it accumulated to form moraine ridges, or was carried beyond the ice margin by meltwater streams where it was deposited as broad sand plains.

The conspicuous sand plains in the southern part of the Kettle Moraine were deposited by streams carrying

meltwater and rock debris from the wasting ice. In the southern Kettle Moraine the sand plains were typically bounded by the glacier on one side and by older, higher remnants of sand plains or moraines on the other side. In other localities, the sand plain might extend from valley wall to valley wall.

Stream sediment underlying the highest part of a sand plain, that part closest to the ice, is in contact with till, the material deposited directly by the ice. In some places the till forms moraines, ridges of thick till deposited at the edge of the ice. In other areas it forms a thin veneer that drapes over the underlying material.

Most of the material at the surface in the Kettle Moraine is sand and gravel deposited by streams that flowed from the wasting ice. Till is exposed at the surface in only a few places. Narrow, north-south trending ridges of sand and gravel were deposited by meltwater streams in several places in the southern Kettle Moraine. They may have been deposited in crevasses, or they may be eskers, deposited in tunnels beneath the ice. In many places eskers and crevasse fills cannot easily be distinguished from one another.

Kettles, the features that inspired the naming of the Kettle Moraine, are closed depressions in the landscape that formed where ice blocks were buried in stream sediment. If the ice blocks survived until after streams ceased depositing sediment and then melted, the overlying sediment collapsed forming the kettles.

In the northern part of the Kettle Moraine the broad sand plains, so evident farther south, are for the most

part absent. Apparently the meltwater flowing from the wasting ice lobes was flowing in fairly well defined channels that did not deposit broad sand plains. For instance, the two prominent north-south trending ridges in the Dundee area, one near Long Lake and one farther east (the Parnell Esker is part of it) are composed almost entirely of sand and gravel deposited by meltwater streams. These streams flowed in channels that were walled by ice. As the ice retreated the meltwater cut channels such as the one that Mink Creek now flows in.

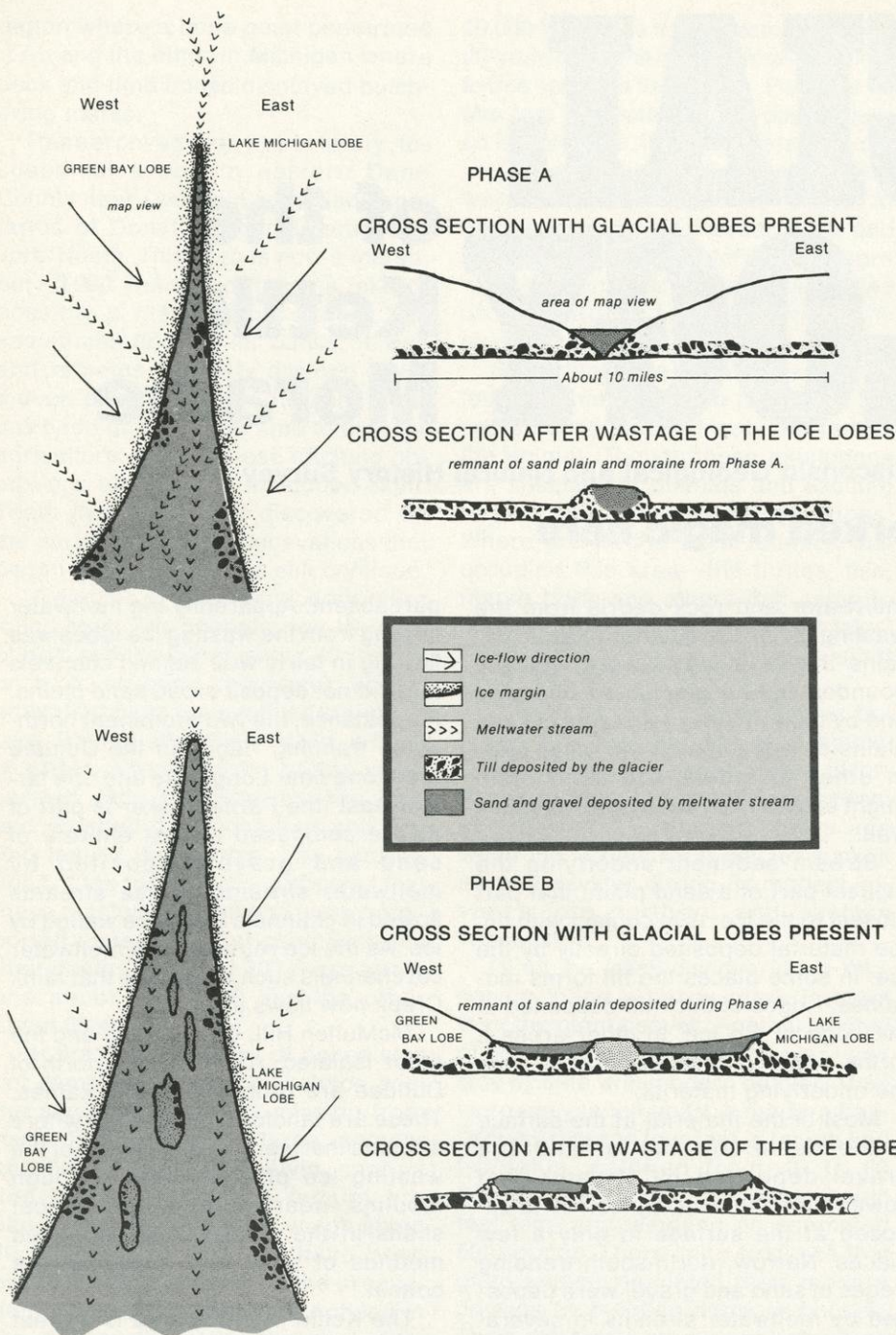
McMullen Hill, Garriety Hill and the other isolated, rounded hills north of Dundee are probably moulin kames. These are landforms deposited where streams that were flowing on top of the wasting ice plunged down through moulins, nearly cylindrical vertical shafts in the glacier, and deposited mounds of sand and gravel at the bottom.

The Kettle Moraine area is a great place to wander around with a topographic map in hand and think about how the landscape formed. Look at the shape of the landforms and try to see what type of material they are made of. Is it a broad flat area, or is it a narrow ridge? Is it sand and gravel or is it till? How might it have formed? These are the clues to understanding the glacial history of the Kettle Moraine.

If you are interested in reading more about the glacial geology of southeastern Wisconsin, try these references:

Black, R. F., 1974, *Geology of the Ice Age National Scientific Reserve of Wisconsin: National Park Service, Monograph No. 2.*

Alden, W. C., 1918, *The Quaternary geology of southeastern Wisconsin: U.S. Geological Survey Professional Paper 106.*

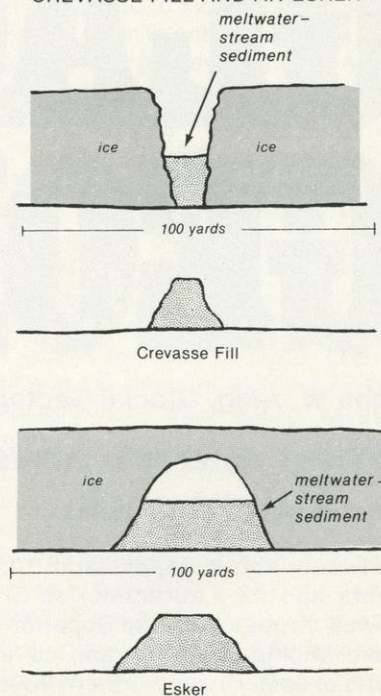


Generalized sequence of events that could result in a landscape similar to that near Eagle, Wisconsin. In phase "A" the Green Bay Lobe and Lake Michigan Lobe have wasted back and meltwater streams are depositing a south-sloping sand plain between the Green Bay Lobe on the west and the Lake Michigan Lobe on the east. Along the ice margin, till accumulates, but most will later be buried by meltwater-stream-deposited sand and gravel. The ice then wastes back further, leaving the sand plain as a high, nearly flat area in the landscape. The edges of the sand plain that are supported by the ice during phase "A" later collapse when the ice that was supporting it melts. This

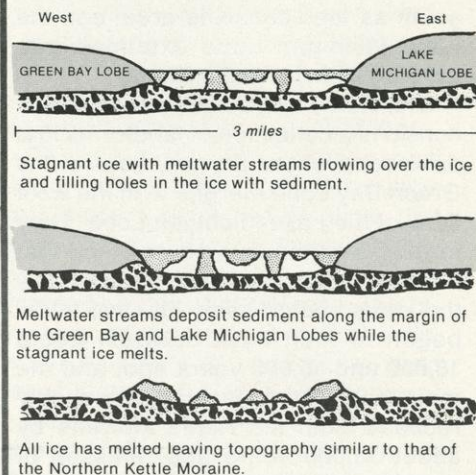
collapse results in hummocky areas underlain mostly by meltwater-stream-deposited sand and gravel.

After the ice margin melts back from its position in phase "A" it again stabilizes as shown in phase "B." Again meltwater streams deposit a south-sloping sand plain. Remnants of the sand plain deposited during phase "A" stand above the sand plain being deposited during phase "B". The remnants of the oldest sand plain, the one deposited when there was only a narrow corridor between the Green Bay and Lake Michigan Lobes, are some of the highest points in the topography of the southern Kettle Moraine.

FORMATION OF A CREVASSE FILL AND AN ESKER



HYPOTHETICAL SEQUENCE OF EVENTS IN THE FORMATION OF THE NORTHERN PART OF THE KETTLE MORAINES



Sequence of glacial events that would form a landscape similar to that north of Dundee. As the Green Bay and Lake Michigan Lobes waste back, meltwater cuts channels along both sides of a mass of stagnant ice that lies between the two lobes. In some places meltwater flows across the stagnant ice and plunges down through holes in the ice to form the moulin kames. The eventual removal of ice from the area leaves the material deposited in the ice-walled channels, and the moulin kames standing in relief. As the margin of the Lake Michigan Lobe wastes back, channels such as the one now occupied by Mink Brook were cut by meltwater streams.



Parnell Esker. Photo by Roger Reif



A present-day glacier in Alaska creates embryonic knob and swale topography typical of Wisconsin's Kettle Moraine region. The ridge of material at the ice margin shows these features forming. Beyond them is a stream-deposited sand plain, another typical Kettle Moraine feature. Photo by author

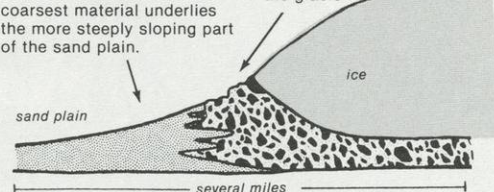
DEPOSITION OF A SAND PLAIN AND A MORaine

Meltwater – stream Sediment

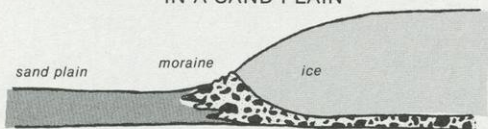
Sand and gravel in layers, most particles rounded, little silt or clay is present. The material is coarsest near the ice and becomes finer with distance from the ice. The coarsest material underlies the more steeply sloping part of the sand plain.

Till

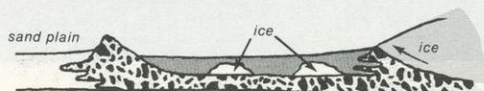
Particles of many sizes, some are rounded, but many are angular, not in layers. Many particles are scratched from being ground against each other and the rock beneath the glacier.



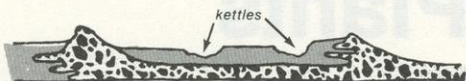
FORMATION OF PITS (KETTLES) IN A SAND PLAIN



Ice at its maximum extent; there are no kettles in the sand plain beyond the ice



The ice margin wastes back and another sand plain is deposited. Some blocks of ice are buried beneath the sand plain.

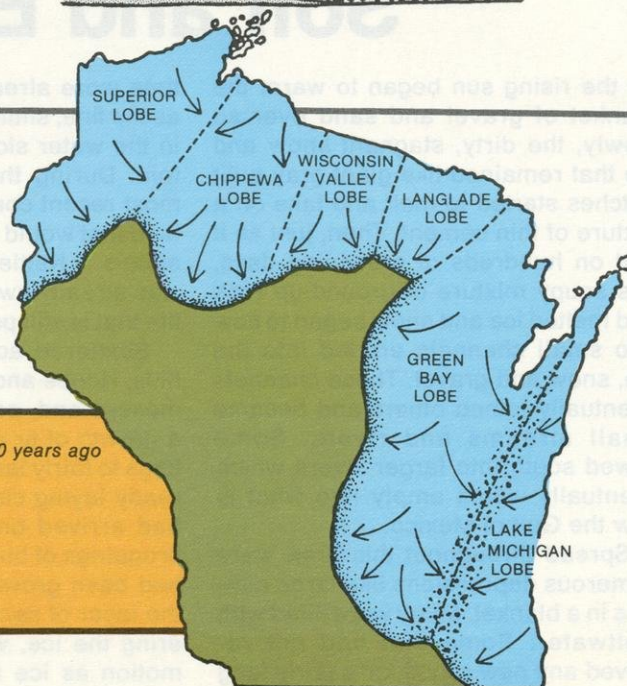


The buried ice blocks melt and the overlying meltwater-stream sediment collapses to form kettles.

*** A photo of the Greenbush Kettle on the inside front cover shows how these glacial features look today.**

LOCATION OF THE GREAT GLACIAL LOBES

- Maximum extent of ice between 25,000 and 10,000 years ago
- Ice-flow direction
- Location of Kettle Moraine
- Approximate boundary between lobes





Tamarack, a characteristic tree of northern bogs, was present at the time of the glacier. The dominant forest was spruce and fir. Photo by Ron Kurowski

Soil and Early Plants

As the rising sun began to warm the blanket of gravel and sand ever so slowly, the dirty, stagnant snow and ice that remained like giant gray quilt patches started to melt and take on a texture of thin cement. Then, just as it had on hundreds of preceding days, this soupy mixture of ground-up rock and melted ice and snow began to flow into small channels eroded into the ice, snow and gravel. These channels eventually joined others and became small streams and rivers. Some flowed south into larger rivers which eventually would empty into what is now the Gulf of Mexico.

Spread throughout this area were numerous depressions like large dimples in a blanket. Many were filled with meltwater. Some that had not received any new runoff for a fairly long

time were already beginning to clear as the fine, siltlike material suspended in the water slowly settled to the bottom. During this last melting of the most recent continental ice sheet, the land that would eventually become the state's Kettle Moraine State Forest was already awakening to a parade of life that is still passing in review today.

Scattered across its landscape of hills, ridges and valleys were lichens, mosses and, perhaps most distinctly, a growth of fir and spruce. From saplings to fairly large trees, they were already laying claim to the land. Seeds had arrived on the wind and in the droppings of birds. Large trees, which had been growing atop the glacier in the layer of sand, gravel and soil covering the ice, were lowered in slow-motion as ice melted to the present

ground level. Many took root there. Thousands of others of all sizes were not as fortunate. They died and decayed to begin that marvelous act of topsoil building which became the foundation of the area's diversity of plants and animals.

Those early spruce and fir forests of 15,000 to 25,000 years ago, together with their characteristic flora and fauna, eventually faded into the past and yielded to the oaks and mixed hardwoods. Each and every generation of trees and plants contributed to an ever-changing soil. This changing soil, together with other non-living but life-sustaining components—air, water and sunlight—determined the nature of all life in the Kettle Moraine and has done so right up to the present day.

Northern and Southern Unit Vegetation

SIMILAR...



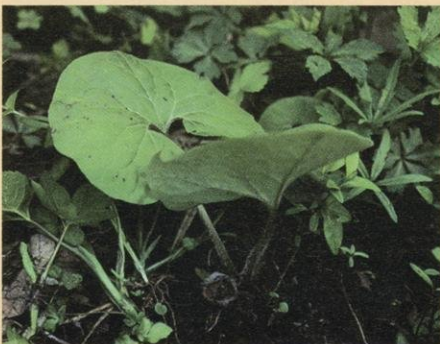
Yellow trout lily.



Bloodroot.



White trout lily.



Wild ginger.



Dutchman's breeches.

Woodland Wildflowers

Some of the earliest flowering plants occur in the Kettle Moraine woodlands which are protected from cold winds by trees and shrubs. Dark, black tree trunks attract the sun's rays, warming adjoining soils. The main flowering period is in springtime before the tree canopy develops to block the sun's rays from the forest floor. All of these blossom in April, May and early June.

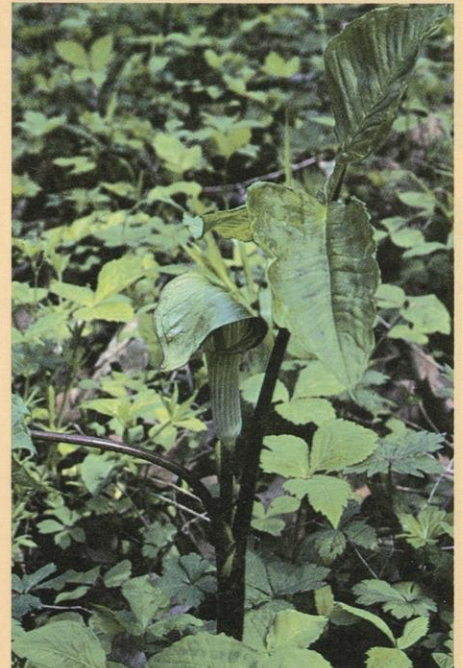


Spring beauty.



Photos on pages 21 and 22 were taken by Ron Kurowski unless otherwise indicated

White trillium.



Jack-in-the-pulpit.

During a leisurely drive through the Kettle Moraine, a person might assume that the Northern and Southern Units are similar in plant and animal life since both are heavily forested. But even though only 40 miles separate them, there are surprisingly major differences. The most noticeable are in spring when the wildflowers bloom. The Northern Unit has many woodland species, such as spring beauty, toothwort, great white trillium, nodding trillium, white trout lily and others, while the Southern Unit lacks most of these early bloomers. In fact, no great white trilliums have yet been found anywhere inside Southern Unit boundaries.

BUT DIFFERENT



Shooting star.



Prairie dock.



Compass plant. Photo by Richard Van Osch



Pasque flower.

Photo by Dean Tvedt



Bird's-foot violet.

Prairie Wildflowers:

Many fine remnants of prairies and oak openings still exist in the Southern Unit and some of the larger sites are set aside as special Natural Areas. The main flowering period is from late spring to late summer.



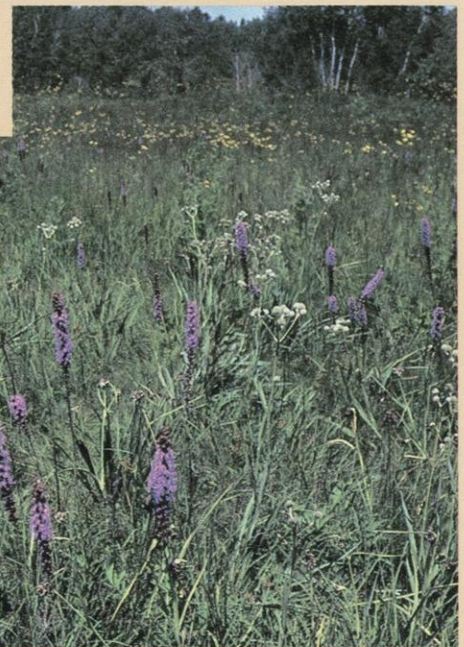
Downy Phlox.



Prairie wild indigo.



Prairie smoke.



Southern Unit wet prairie with gayfeather (purple), prairie coneflower (yellow) and rattle snakemaster (white) in bloom.

By the same token, the Northern Unit has no pasque flowers, a species common in the Southern Unit, and very few prairie and oak opening remnants or the flowers that go with them—prairie smoke, birdsfoot violet, blue-eyed grass, downy phlox, golden alexander, and puccoon.

These unusual differences in vegetation were probably not caused by settlement because they existed even before pioneers appeared on the scene. In the 1830s, the dominant trees in the Northern Unit were sugar maple, basswood, elm, beech, red oak, and other species that thrive on a moderate amount of moisture—a plant community known as the southern mesic forest. By contrast, the dominant vegetation of the Southern Unit included prairies and oak openings. Large grasslands with many flowering forbs developed on the flat glacial outwash areas of the Southern Unit. Among them are prairies with names like Melendy's, Eagle, Heart, Round and Whitewater. Oak openings, which resemble prairies with a scattering of bur and white oaks among the grass and flowers, evolved on the hilly moraines.

While many vegetative species of the Northern and Southern Units overlap in a relatively narrow band of common climate called the tension zone, at least two influences worked to make the plants in each place different:

1—For hundreds of years in the Southern Unit, Indians intentionally set fires in spring and fall, killing off the woody plants that would otherwise invade a grassland and turn it to forest. They probably did this to improve habitat for the animals they hunted, to make travel easier, and to reduce mosquitoes around campsites and villages. At the same time, the recurring fires created and perpetuated the prairies and oak openings. Lightning and other natural causes also started fires, but not on a scale large enough to permanently revamp all the vegetation. Since grass and wildflowers die back to the soil surface each winter, the life-germ is protected from fire in the roots and the prairies persist.

2—Another influence was the soil. The Northern Unit contains better soils composed mostly of silt loams on the more level sites and stratified sand and gravel on many of the ridges or moraines. Soils in the Southern Unit contain more sand and more of the ridges and hills are pure gravel. Each support characteristic, but different vegetative communities.

Settlers and vegetation

Ever since the late 1830's, white settlers and their descendants have cultivated large tracts, introduced different plants, grazed livestock, stopped the Indian fires, and cut down forests. Dominant plants are no longer the same. Present vegetation of the Kettle Moraine consists of remnants of the original coupled with cultivated and disturbed acres covered with an exotic vegetative potpourri of introduced plants.

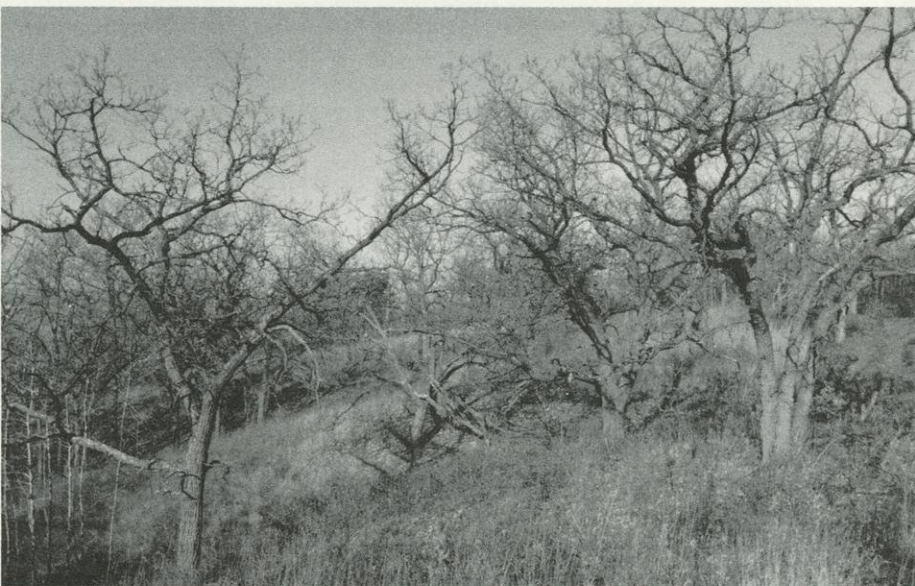
Nevertheless, today nearly half of Wisconsin's 30-plus plant communities still exist in the Kettle Moraine, including wet and dry southern and northern forests, tamarack swamps, bogs, fens, thickets, sedge meadows, oak openings, cedar glades, wet and dry prairies, lowland prairies, pine plantations, weedy fields and a cliff community.

Today there is probably more oak forest in the Kettle Moraine than ever before because, when the Indian fires stopped, most of the uncultivated oak openings and prairies grew up to trees.

The dry forest of the Southern Unit grows on the well-drained gravel and sandy soils of the rugged interlobate

moraine. Dominant trees are the white, red, black, and bur oaks. The understory is quite dense, with many small saplings and shrubs, such as gray dogwood, hazel nut, prickly ash, blackberry, and honeysuckle. Other trees include black cherry, shagbark hickory, white ash and quaking aspen. The wildflowers of the southern oak forest include round lobed hepatica, mayapple, false Solomon's seal, yellow lady slipper, bellwort, bloodroot, wild geranium and enchanter's nightshade, among others. On north-facing slopes and in deep kettle holes where it is cooler and more moist, trees grow that are dominant or common in the Northern Unit—like basswood, red oak, ironwood, and a few sugar and red maples.

The Northern Unit's forest consists mostly of second and third growth trees. In addition to the dominant species, the Northern Unit also has the less common American beech, white birch, red elm, red maple and big tooth aspen. Because of the heavier shade cast by the sugar maple, these forests lack the dense shrub layer so prevalent in the south. Many very beautiful wildflowers grow in the Northern Unit's rich woodlands.



Natural Areas

The Blue Spring Oak Opening is an official State Natural Area.
Photo by Ron Kurowski

Rare plant communities are protected and managed under the Natural Areas Program administered by DNR's Bureau of Endangered Resources. Today a total of 20 natural areas have been designated or

are in the process of being designated in the Kettle Moraine State Forest. Protected areas set aside include prairies, woodlands, bogs, oak openings, fens, and sedge meadows.



Looking down a row of red pine. The Kettle Moraine has 7,500 acres of coniferous plantation.
DNR photo

TIMBER MANAGEMENT

Ever since settlement and cultivation of the Kettle Moraine region in 1835, habitat, vegetation and wildlife have steadily changed or deteriorated. But after state acquisition, managers worked hard at restoration. And their efforts paid off. An extensive reforestation program began in 1939. Since then, approximately 7,500 acres of coniferous plantations have been planted on the Northern and Southern Units. Red and white pine are the major species.

In 1947, two research forests were established, Dundee in the Northern Unit and Emma Carlin in the Southern. Their purpose is to experiment with various harvest methods in an effort to maintain the oak stands that are so prevalent in the Kettle Moraine.

The State Forest now produces pulpwood and veneer and ever since the oil crisis of 1974 has been an important fuelwood source.

Wildlife history

Several dozen species of fish, around 15 different amphibians, the same number of reptiles, numerous birds, 30 to 40 different mammals and thousands of species of insects live in the Kettle Moraine. Historically, the region supported black bear, timber wolves, elk, buffalo, prairie chicken, wild turkey, bobcat, and passenger pigeons. But changing habitat and the influx of people did them in.

Records show a black bear killed near Cold Spring in 1835, another in 1836 in northeastern Walworth County and a third in 1840 in the Bark River Woods near Sullivan. The last Kettle Moraine bear was killed in 1856 near Watertown.

A pioneer resident who heard the howl of timber wolves wrote that "It seemed as if the ground shook from the violence of these creatures." A hunter recorded that he killed nine one winter in the Bark River Woods. By the late 1850s they had disappeared.

Prior to settlement, elk were sighted along the Bark River in 1829, but there are no accounts afterwards.



In the 1880s prairie chicken were so common they were featured on the menu of area restaurants.



Several antlers have been found in the Southern Unit, including part of one discovered in 1983 on the Kincaid farm west of Palmyra.

Elk flourished until habitat changed. Photo by Staber Reese

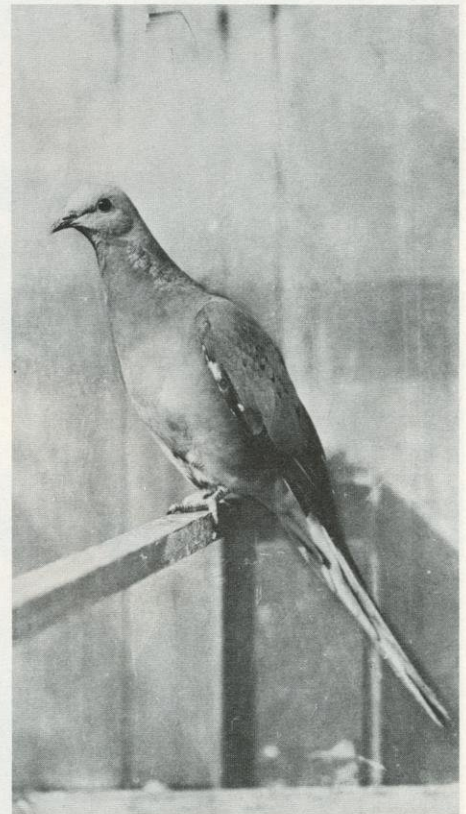
Bison probably died out just prior to settlement. Pioneers reported seeing buffalo droppings and horns on Koshkonong Prairie and verbal accounts suggest a few might have survived until 1840. An early pioneer named John Maul was reported to have shot one near Slabtown (Rome Pond). Its pelt is now on display at the Visitor Center in the Southern Unit.

Prairie chickens were so abundant in the 1880's they were served on a regular basis at the Bidwell Hotel in Palmyra. The birds vanished in the 1940's when the last few low-lying prairies and wetlands were drained.

Bobcats were also relatively common. One hunter killed several in the Bark River Woods in the early 1840's and two were shot at Whitewater Bluffs as late as 1875.

In 1836 as many as 30 wild turkeys at a time were observed in the northern part of Walworth County.

The now-extinct passenger pigeon was also once very numerous with reports of flocks that obscured the sun. So many roosted in trees they actually broke off large branches. Two known roosting areas were located in the town of LaGrange.



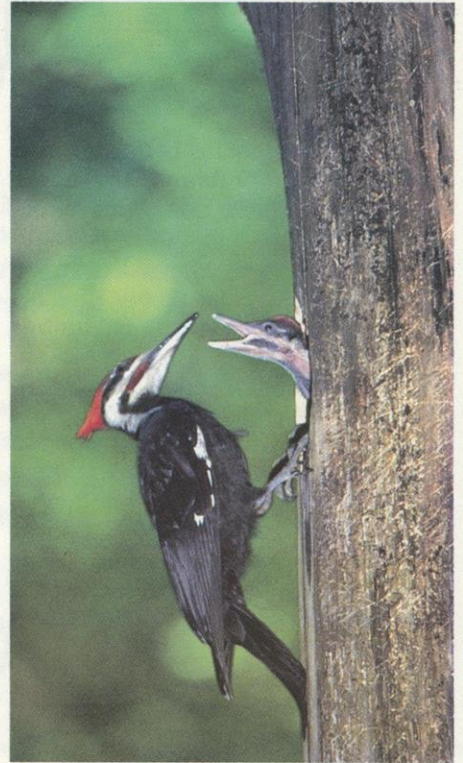
The extinct passenger pigeon once roosted in Kettle Moraine trees. Photo by J. G. Hubbard

Present day wildlife

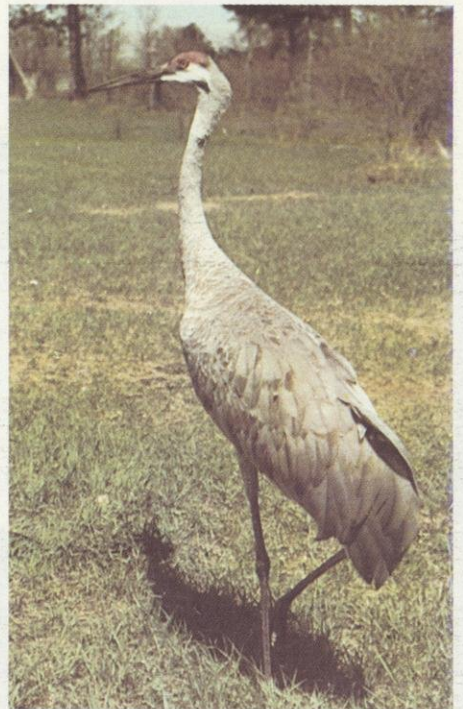
In the last few years wild turkeys have been re-introduced into both units of the Kettle Moraine and are taking hold. Ruffed grouse were re-introduced in the Southern Unit from 1974 to 1976 and even though populations are still low, descendants of these birds can still be found throughout the area.

Some animals once extirpated (extinct in a certain region) are returning on their own. Beaver and their dams (scarce before 1974) are now found on many of the larger streams. Shortly after return of the beaver, otter started reappearing. Coopers hawks, once listed as threatened in Wisconsin, are now common nesters in the Kettle Moraine. Coyotes are often seen and, at night, are heard howling. There have been bobcat sightings, and sandhill cranes, once considered relatively rare, have rebounded and nest in the wetlands.

No doubt, other animals will also return and prosper. This will occur because as habitat disappears in the surrounding area, the Kettle Moraine will become increasingly important as the last large major sanctuary in southeastern Wisconsin for plants and animals.



Pileated woodpecker. Photo by Herb Lange

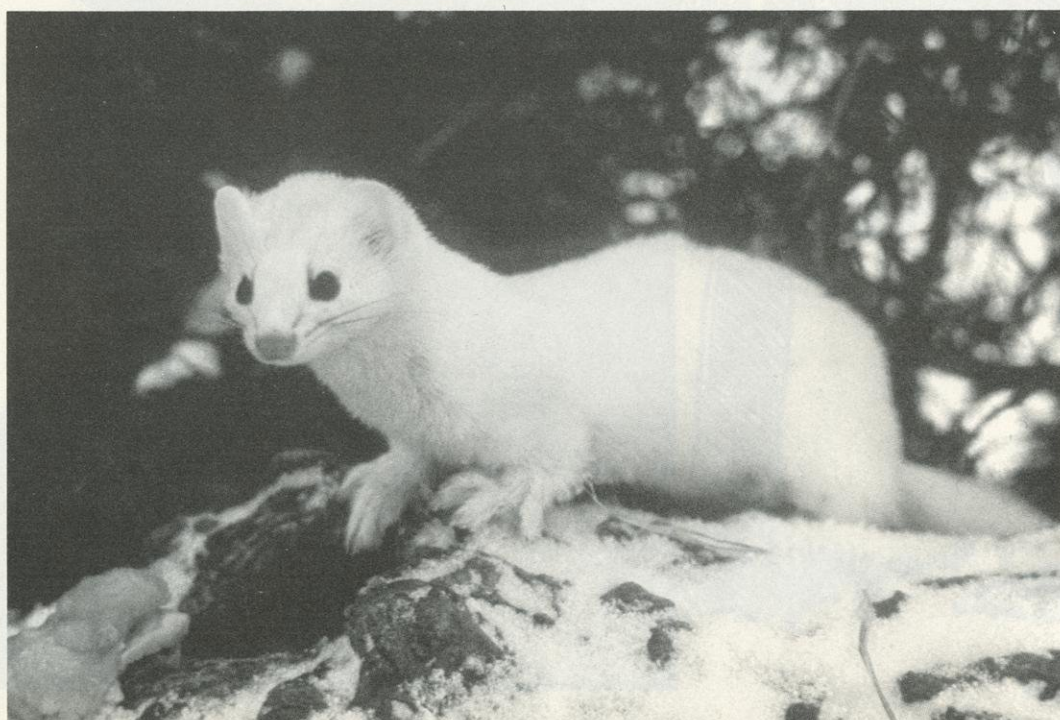


Sandhill Crane. Photo by Chauncey Weitz

A litter of red fox. Photo by Herb Lange



Whitetail deer. Photo by Ron Kurowski



Weasel. Photo by Herb Lange

THE

Prairie Potawatomi

Illustrations by William J. Kubiak from
his book *Great Lakes Indians*.



When settlers entered the area that is today the Kettle Moraine Forest they found the Prairie Potawatomi Indians to be the dominant tribe. These Native Americans were but one of many Indian nations to live here during the thousands of years since the last glacier left the region. Artifacts found in the township of Ottawa indicate that an Early Archaic Indian Culture existed here as far back as 8,000 years ago. But most of the things we know about Indians come from the later cultures, especially the Prairie Potawatomi who were reported in Wisconsin as early as 1670.

Their round wigwams or lodges were 10 feet high and 12 to 20 feet in diameter. In the center, the fireplace was a pit scraped into the ground and lined with stones.

The Potawatomi were good hunters and skilled fishermen, using such tools as spears, bow and arrow, seines, fishline, and fish traps built with boulders laid across streams and rivers. At Pewaukee Lake, a popular fishing spot, the fish were split, smoked, and sundried for later use.

In addition, crops like corn, beans, pumpkins, and gourds were grown. The large permanent village at Mukwonago sometimes produced as many as 5,000 bushels of corn per year.

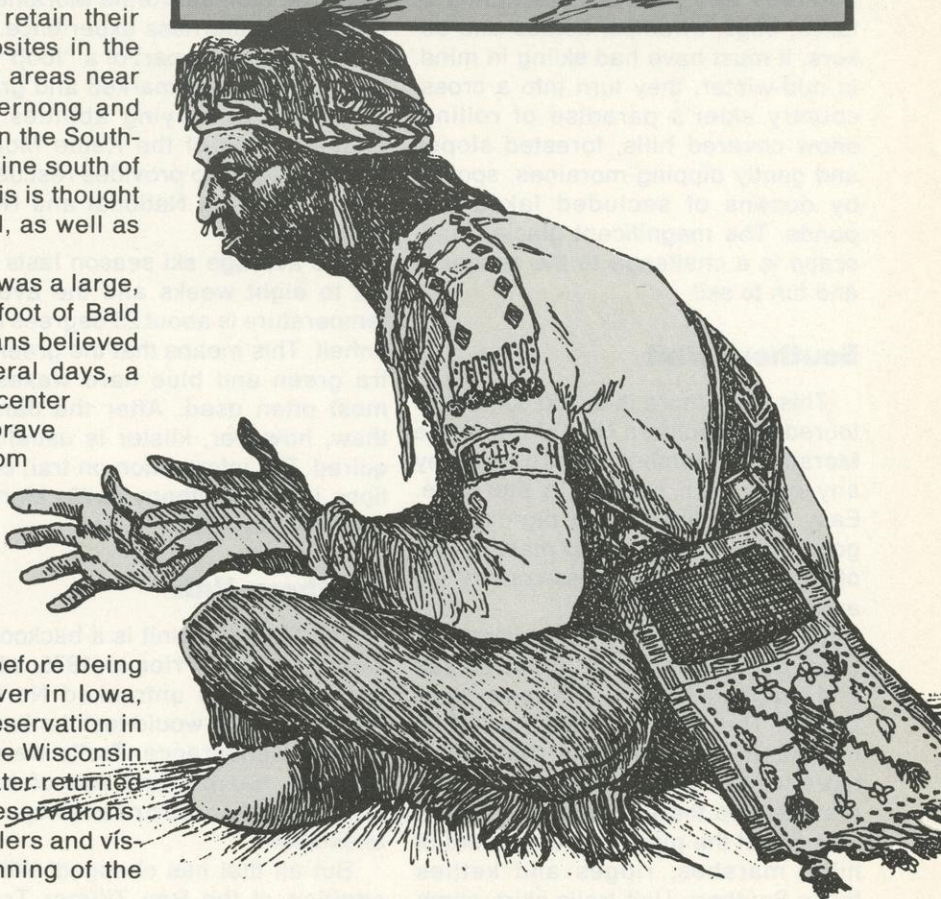
Dugout canoes made of basswood and other logs were used for transportation. An old newspaper account described an Indian in Palmyra making a dugout canoe out of a white oak log. With primitive tools, it took him three weeks to complete the craft.

At Mukwonago, the Indians built a special circular track for pony racing, a favorite sport of the Potawatomi. Early settlers described the races as wild and exciting.

Many of the Indians lived in the Chenequa and Oconomowoc Lake country because of the abundance of natural resources nearby. Many lakes in the region retain their Potawatomi names today. Other Indian campsites in the Southern Unit were found on high, dry, sandy areas near springs and marshes and along the Scuppernong and Whitewater Rivers. An interesting Indian site in the Southern Unit is Bald Bluff, a high point in the moraine south of Palmyra. From evidence uncovered thus far this is thought to have been a council grounds and signal hill, as well as the site of ceremonial dances.

Another glacial feature Indians held in awe was a large, 80-foot deep circular kettle at the southeast foot of Bald Bluff called the Great Spirit's Wash Bowl. Indians believed that if the wind blew from the south for several days, a great column of water would come from the center to fill this kettle hole. It was thought that any brave who swam in this water would be protected from harm in battle, guarded by the care and protection of the Great Spirit.

In a treaty with the federal government signed in Chicago on September 26 and 27, 1833, the Potawatomi were forced to cede all their land to the United States. They were allowed to remain for another three years before being sent to a reservation along the Missouri River in Iowa, which in turn was ceded in 1846 for another reservation in Kansas. Many of the Potawatomi failed to leave Wisconsin in the first place, and many of those who did later returned because of their dissatisfaction with the reservations. These Indians continued to live among the settlers and visited the Kettle Moraine area until the beginning of the 1900's.



SKIING

THE KETTLE MORAINE

Gary Mueller
editorial intern

If skiing magic exists in southern Wisconsin, much of it has to be concentrated in the winter wonderland of the Kettle Moraine.

The Kettle Moraine State Forest is ideal nordic ski country—one of those rare and beautiful areas where nature has sculptured terrain to serve sport. When the great ice sheet filled in lakes, rounded off hills, forced rivers into new channels, gouged out potholes and created thousands of lakes, bogs, swamps, kettles and eskers, it must have had skiing in mind. In mid-winter, they turn into a cross-country skier's paradise of rolling, snow covered hills, forested slopes and gently dipping moraines, spotted by dozens of secluded lakes and ponds. The magnificent glacial landscape is a challenge to the senses—and fun to ski!

Southern Unit

This year, more than 150,000 skiers toured the Southern Unit of the Kettle Moraine—a number unsurpassed by any other trail system in the state. Easy accessibility to the big city and good snow patterns help make it one of the most popular cross-country ski areas in Wisconsin.

Formerly covered with prairies, it is now mostly hardwood forest of oak and shagbark hickory, plus pine plantations. The forest is crisscrossed by four main trail systems that cover more than 60 miles. They delight skiers because there is nothing predictable about the glacial arrangement of hills, marshes, ridges and kettles these Southern Unit trails skirt, climb and cross.

The Nordic Trail attracts most of the beginner traffic with its flat-to-rolling terrain. The Scuppernong and McMiller systems offer 34 trail miles that challenge even the most advanced skier. And embodying the spirit of backcountry touring is the John Muir Trail, the ultimate Kettle Moraine setting for a wilderness experience.

All trails are a part of a "loop" system and are well-marked and graded for skiers of varying abilities. The Southern Unit of the Kettle Moraine State Forest also provides rescue services, including National and Nordic ski patrols.

The average ski season lasts from six to eight weeks and the average temperature is about 25 degrees Fahrenheit. This means that the green, extra green and blue hard waxes are most often used. After the January thaw, however, klister is usually required. For information on trail conditions in the Southern Kettle Moraine, call (414) 594-2135.

Northern Unit

The Northern Unit is a backcountry skier's dream. Prior to 1975, after a snowstorm the untracked Northern Kettle Moraine would test the limits of a skier's endurance. Trails were unmarked, narrow and full of brush, sometimes approaching the unskiable.

But all that has changed. With the addition of the Ray Zillmer Trail in

1981 and New Fane in 1985, the heart of the Northern Unit's backcountry is more accessible. Now on any sunny day, perfectly rounded turns track into peaceful moraines and skiers of all ages can double pole along more than 30 miles of well-marked trail.

The 1985-86 season brought more than 75,000 cross-country skiers to the Northern Unit's three trail systems. Greenbush Trail is the most used and offers a gentle mix of terrain that entertains beginning skiers as well as experts. The tough Ray Zillmer Trail offers 10 miles of wilderness adventure that won't soon be forgotten. And the newest of the three, New Fane Trail, is fast gaining popularity, especially with beginners. Here too, the trails are part of a "loop" system and are well-marked and graded for skiers of varying abilities. The National Ski Patrol provides rescue services.

Ski season in the Northern Unit usually lasts about eight weeks, sometimes as long as 12. The average temperature of about 20 degrees Fahrenheit means special green, green, and special blue waxes are most often used. After the late winter thaw, however, klister is usually required. For information on trail conditions in the Northern Unit, call: weekdays, (414) 626-2116 and weekends, (414) 533-8322.

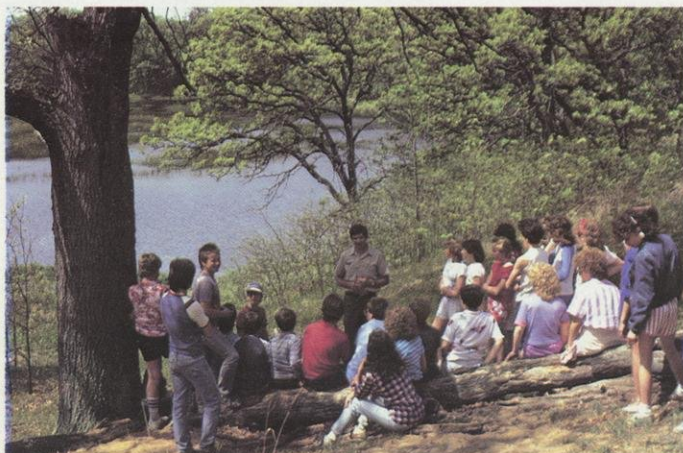


Photo by Michele Studios, Rt. 2., Whitewater WI 53190

AND OTHER ACTIVITIES . . .



Canoeing on Ottawa Lake. Photo by Ron Kurowski



Nature walk. Photo by Ron Kurowski



Trout fishing at Paradise Springs. Photo by Ron Kurowski



Swimming is one of the most popular activities. DNR photo



1.



2.



3.



4.

- 1. **Hiking at the Parnell tower.** Photo by William Moorman
- 2. **More than 175,000 camping units set up at the Kettle Moraine each year.** Photo by Walter J. Adams
- 3. **Mushroom gathering.** Photo by Ron Kurowski
- 4. **Nature trail for the mobility impaired.** Photo by Ron Kurowski