

Map of John Muir Park



John Muir Park Ice Age Trail Guide



Ice Age Trail

This booklet will guide you through the two-mile segment of the Ice Age Trail in John Muir Memorial County Park. The Ice Age Trail is an extraordinary 1000 mile foot path that travels from the Lake Michigan shoreline at Potawatomi State Park to the basalt

cliffs above the St. Croix River. Most of the land forms on the trail were created by the Wisconsin Glaciations 10,000 years ago.

About the IAT Alliance & Marquette Chapter

The Ice Age Trail Alliance is a volunteer- and member-based nonprofit organization. To find out more about activities or to join the IATA, call 800-227-0046 or go to the website www.iceagetrail.org. Reference the Marquette County Chapter link for upcoming events and information on becoming a member of this dynamic organization.

For more information on chapter activities and/or hiking the Ice Age Trail in this region, contact the volunteer chapter coordinator:

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The Trail Guide Committee comprised of: Laurel Bennett, Tom Ellington, Tiffany Lodholz, & Karen Wollenburg, thanks Kathleen McGwin, Shelley Hamel, and Fred Wollenburg for reviewing and editing this guide. We are especially thankful for the many beautiful original illustrations created by Barry Eichinger, and to Julia Jiannacopoulos for pulling it all together in a final layout.



John Muir

John Muir, renowned "Father of the National Park System" and first president of the Sierra Club, moved from Scotland to Marquette County, Wisconsin at the age of 11. The family farmstead included a portion of John Muir Memorial County Park. The roots of Muir's love of nature and desire to preserve land for its aesthetic value travel deep in the fens and oak savannas of Marquette County and the Park environs.

Observation Point #1: Kiosk

Linger awhile on the kiosk bench, look out over the prairie, and reflect on what this landscape represents. Twelve thousand years ago, the Green Bay lobe of the Wisconsin glaciation that covered Marquette County began retreating, exposing barren sand and gravel, with a huge block of ice buried beneath. Gradually, this well-insulated remnant ice melted, the overlying sand and gravel slumped into the space vacated by the ice, and Ennis Lake was born.

Wind-blown seeds and spores arrived – lichens, grasses, and other pioneer species capable of living in harsh conditions gave the land a faint fuzz of green. In this glacially influenced climate, fir, spruce and other conifers dominated, much like the boreal forests of Canada today. Gradually as the climate warmed and dried, the needle-leaved species gave way to oaks and hickories. At first lightning-induced and later deliberately set by Native Americans, fire arrived with the warmer climate. Regular fires favored some species and eliminated others, shaping the vegetation into prairie and oak savanna.

Selected plants of John Muir Memorial Park

Upland and Wetland

Forbs

Bergamot
Black-eyed Susan
Bottle gentian
Butterfly milkweed
Canada goldenrod
Canadian tick-trefoil
Common mountain mint
Cream false indigo
Culvers root
Cupplant
Grass-leaved goldenrod
Hoary vervain
Kalm's lobelia
Lupine
New England aster
Ox eye sunflower
Prairie blazing star
Prairie cinquefoil
Prairie coreopsis
Prairie dock
Purple prairie clover
Round-headed bush-clover
Stiff goldenrod
Swamp milkweed
White water lily
Yellow coneflower

Ferns

American royal fern
Interrupted fern
Lady fern
Maiden hair fern
Sensitive fern

Trees and Shrubs

Black oak
Burr oak
Common juniper
Cottonwood
Poison sumac
Red osier dogwood
Shagbark hickory
Tamarack
White oak
Willow

Grasses and sedges

Big blue-stem
Canada wild rye
Indian grass
Little blue-stem
Pennsylvania sedge
Side oats grama
Tussock and mat-forming sedges

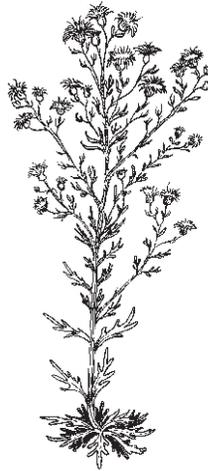
Non-native Invasives

Eurasian milfoil
Garlic mustard
Spotted knapweed
White sweet Clover
Yellow sweet clover

Things to Consider: Invasive species

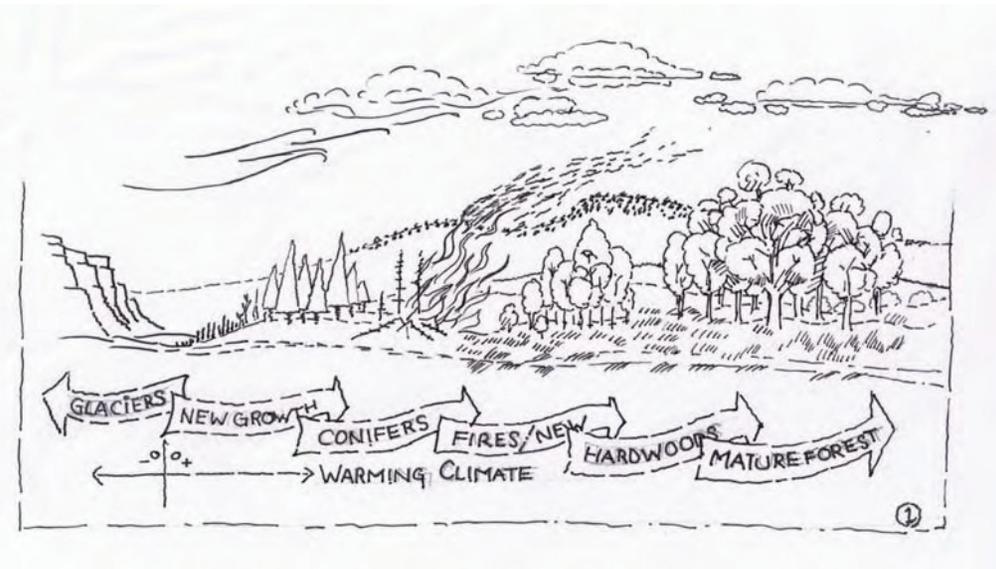
Aggressive plants that are not native to the area where they are growing are referred to as invasive species. In July and August, you may notice plants in this area with a circle of gray-green leaves at their base and small pink to purple flowers that look something like a thistle.

This invasive plant, spotted knapweed, originally came from Europe and Asia, and is quite adept at forcing its way into established plant communities, especially on sandy soils. If not controlled, it may grow so densely that other species are excluded. Knapweed also has the ability to produce chemicals that are toxic to other plants and can be an irritant to human skin.



Unfortunately, spotted knapweed is not the only invasive species at John Muir Memorial County Park. Garlic mustard is found in many wooded areas (crush a leaf—it smells like garlic!). Another invasive, black locust, was originally introduced by John Muir's sister as a windbreak for her garden and formerly grew in the southwest corner of the park. Even the lake itself is not immune to invasives. The Wisconsin DNR has found

Eurasian milfoil in Ennis Lake. Substantial efforts are currently underway to control these invasive species and others within the park and in other nearby conservation areas such as Observatory Hill and the Fox River National Wildlife Refuge. Please help by using the invasive species shoe brush stations at either entrance to the trail and join in the invasive species removal days at the park.



In the spring as you walk down the hill from the kiosk, you may be fortunate to see the large creamy yellow blossoms of cream false indigo. This plant is called false indigo because although a blue dye can be made from its roots, it's not the true blue of the Asian indigo plant. Eventually giant globular seed pods will appear, gradually darkening in color over the summer to a chocolate brown and then black. Eighth-inch long seeds are safely sequestered inside, lined up all in a row much like a pea pod.

Indigo is part of the same legume family as the pea. In late fall, the pods split, and the entire stalk breaks loose, scattering seeds like tumbleweed blown about by the wind.





When the indigo flowers began to fade, their cousin, the lupine, adds a splash of purple blue.

The fens of John Muir Memorial County Park are one of the exceptional plant communities for which it is known. These rare wetlands, often associated with glacial terrain, are characterized by saturated soils and fed by highly mineralized groundwater. Unusual sedges and wildflowers, such as Kalm's lobelia, grow in the Ennis Lake fens. Here, at the lake outlet, one of the more accessible fens can be seen. Notice the white patches in the stream. This is marl, a calcium rich material often found with fens.

National Wildlife Refuges

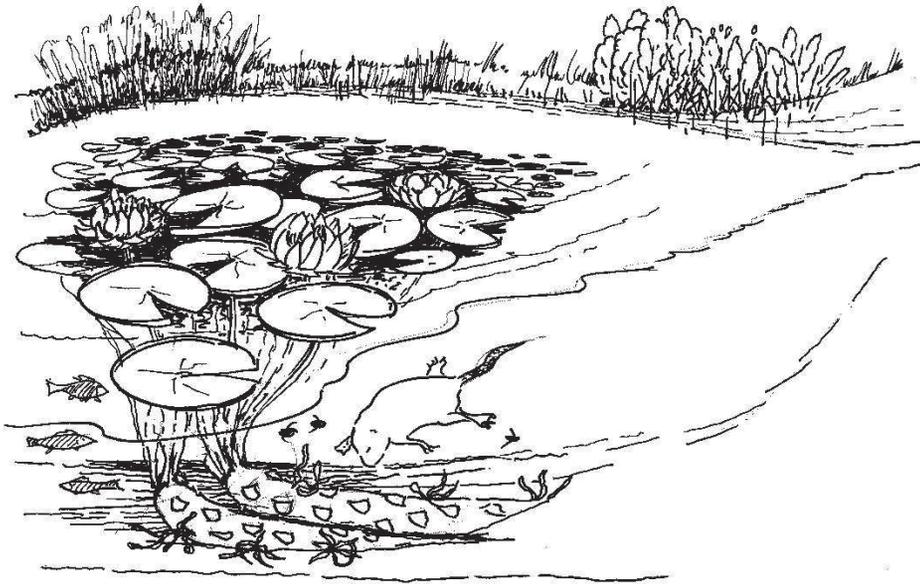
In the autobiography of his boyhood, John Muir spoke of the Fox River marshes and the wildlife they supported. The Ennis Lake outlet stream passes under Hwy F and then meanders through prairies, oak savanna and extensive marsh before joining the Fox River. These lands are now protected as the Fox River National Wildlife Refuge. National Wildlife Refuges are a nationwide network of wildlife areas managed by the U.S. Fish and Wildlife Service. You may hear cranes calling from the refuge in the spring when they are re-establishing territories, and in the fall when they've re-grouped in preparation for migration.

The Fox River Refuge was established in 1979 to protect sedge meadow wetlands threatened by drainage and oak savanna uplands, as well as to protect important breeding and staging area for the greater sandhill crane.

In late spring, the bright red-orange flowers of butterfly milkweed appear in the same area. In the fall, the seed pods blossom into a fountain of tiny white parachutes with flat brown seeds attached. As the name suggests, butterflies, especially monarchs, love this plant.



Looking out over the large cove of the lake, you can see another favorite plant of John Muir, the floating green leaves of the white water lily. Aquatic vegetation, such as this, serves as spawning and nursery areas for some species of fish. The fleshy, underwater rhizomes (stems) of the lilies run across the soft lake floor and add stability. They also serve as food for beaver and muskrats.



Observations Point #10

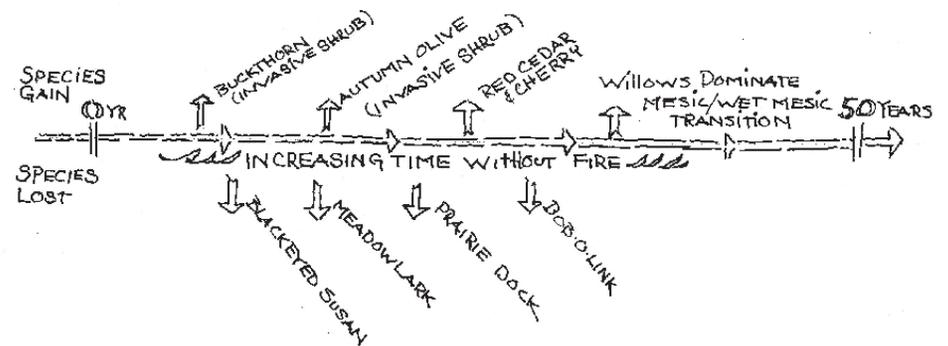
History: State Natural Area (Outlet Bridge)

The park land is owned by Marquette County and jointly managed with the Department of Natural Resources. Sections of the park are designated as a State Natural Area. Wisconsin's 590 State Natural Areas protect outstanding examples of native natural communities, significant geological formations, and archeological sites. They are invaluable for research and educational purposes, and they also provide refuge for rare plants and animals.

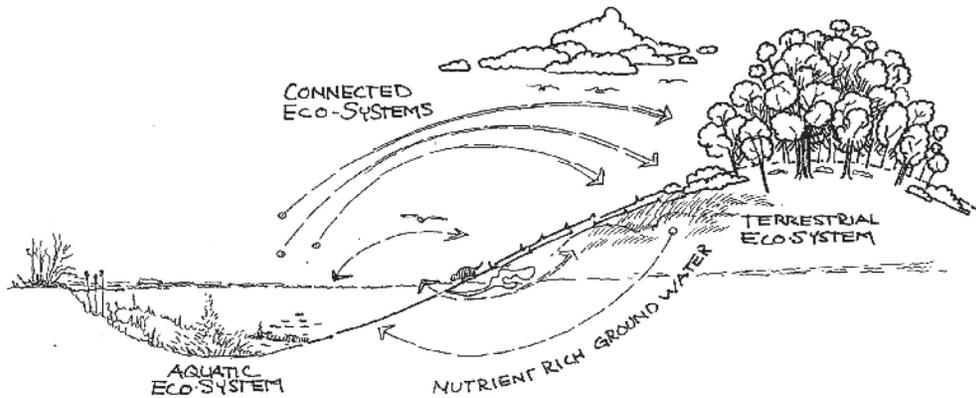
Observation point #2: Restored & Remnant Prairie

Below the hill, the trail forms a dividing line between remnant native mesic to wet-mesic prairie on your right and former agricultural fields restored to prairie on your left. "Mesic" refers to soils that are well-drained but still remain moderately moist, so wet mesic prairies are a little wetter than average. As farming and other development spread throughout Wisconsin and the United States, many of the native plant communities began to disappear or were severely degraded by clearing, grazing, fire suppression, and the spread of aggressive, non-native species. Prairies and especially the various types of savannas became particularly scarce, and so did a number of plants, animals, and insects that depend upon them.

In response, techniques have been developed to restore the native plant communities. Restoration ecologists learned the importance of including prescribed burns as part of their tool kit. After a burn, prairie plants often produce better seeds, and fires set back many of the undesirable species. By removing the debris from previous year's growth, fire also exposes the dark soil and creates the warmer conditions that favor prairie species. Despite our best efforts, however, restored prairies are rarely as rich in species as the original prairies. Many of the intricate linkages between plants, insects and minute soil organisms have been broken and may never be re-established.

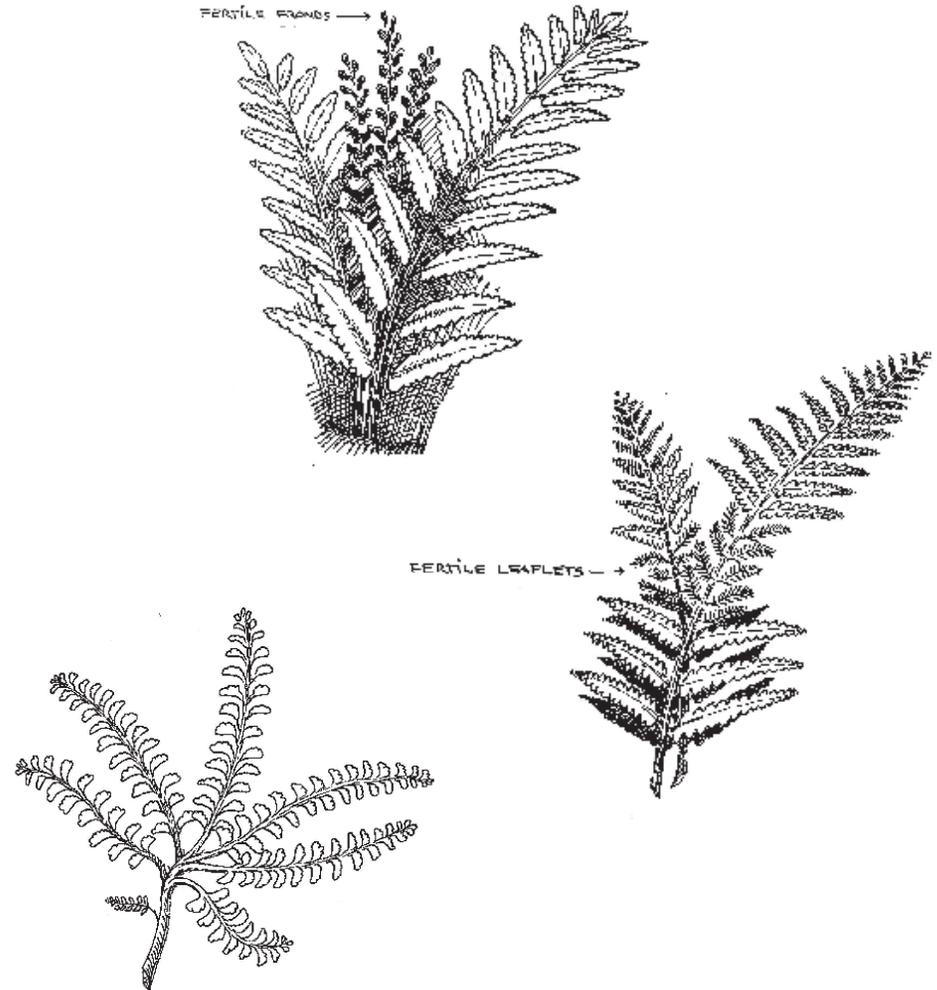


Observation Point #3: Willows



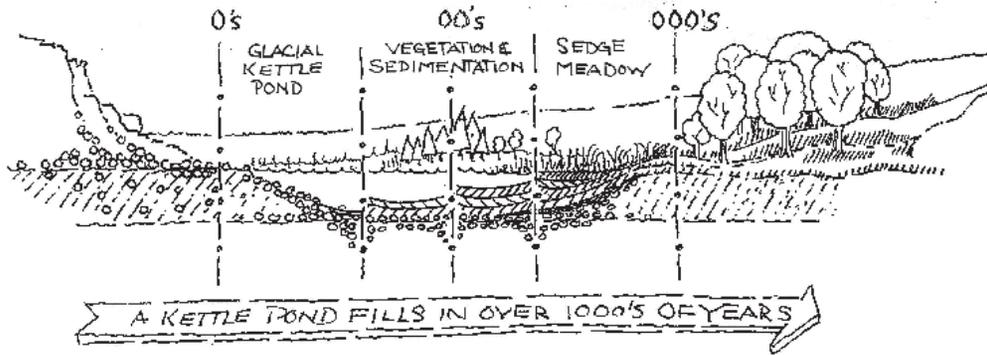
At the large clump of tall shrubs which are willows, let your eyes drift toward the lake. Note the transition from mesic prairie along the trail to wet-mesic prairie toward the lake edge. Looking back the way you came, you see where the trail skirts an oak opening as it drops down the hill from the kiosk, and, less obvious, a small fen – a spring or wetland rich in minerals such as calcium - at the base of the oaks. Across the lake is oak woodland. Each of these areas is a separate community containing a unique mix of plants, but there are many linkages between them. Groundwater collects nutrients from the oak communities, as well as the prairies, and carries them into the wetland and lake. Insects hatch in the lake, and are eaten by birds that nest and drop seeds in the woods and prairies.

Cup plant is a standout species in this area. The sturdy square stems reach seven feet or more toward the sky and are present even in winter. The coarsely toothed, triangular leaves are joined at the stem, forming a cup that collects and holds water after every rain. Small birds are attracted to the water and utilize the stems as perches. Their sunflower like flowers contribute to the yellow wash



Observation point #9: Muir Lake

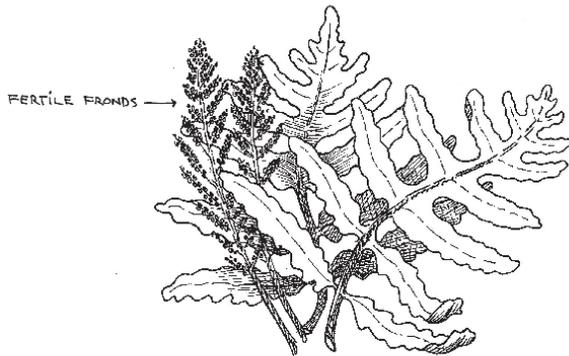
Stop and look at the landforms around you. The trail follows along the base of the hill and you are actually standing on an ancient shoreline. Sometime in the distant past, the lake dropped a few feet over a relatively short time in a geological sense – perhaps as few as fifty years.



As the sedge began to grow out from the edges of the pond, it laid down peat year after year, and gradually squeezed out all the open water, taking with it the powerful flows of the kettle pond drainage into the stream.

Ferns seem to have been a favorite of John Muir, as he references five of them in his writings about his home at Ennis Lake. Can you find these four easily identified ferns along the trail? Look closely at their brown, fertile fronds.

Sensitive fern has fertile fronds on separate stalks, American Royal fern has fertile fronds that diverge from the infertile green fronds, while Interrupted fern has green fronds that are "interrupted" with fertile leaflets. Maiden hair fern has flat topped fronds that sometimes appear to swirl when viewed from above.



of the prairie in early summer and goldfinches begin feeding on the large seeds before they are fully ripened. Prairie dock, closely related to cup plant, is visible just beyond the willows below the trail. The tall, round, leafless stems may exceed the cup plant in height while the nearly 16-inch long elephant ear leaves cluster on the ground. Like the cup plant, they have yellow flowers, and large, nutritious seeds. In some years, black-eyed Susan's, with their plush, dark brown centers and yellow petals, can dominate the scene. Black-eyed Susan's are short lived plants, lasting only a few years, but a fire or other disturbance brings them roaring back once again.

Prairie blazing star borders the prairie dock. Their tall spikes of purple flowers are complemented by the multi-colored butterflies that feed upon their nectar. Eventually the flowers give way to an airy froth of white – tiny parachutes with attached seeds waiting for the wind to waft them away.

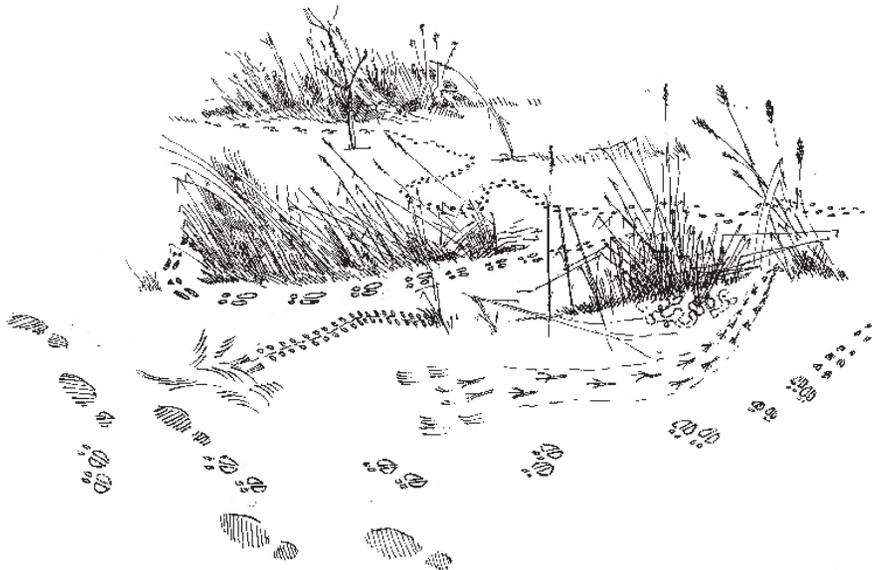


Observation Point #4: Take notice of animal tracks, birds, nests, and spider webs.

What do you see?

Each season reveals different subtle details about the prairie. Prairie grasses are known for their beautiful fall and winter blends of reds, beiges and browns. Flocks of fifty or more tree sparrows may gather in exceptional years, bobbing on the very tops of the grasses, or slowly riding the grass heads down to the ground, feeding on the seeds.

Fresh snow provides a window into life on the prairie. The delicate, closely spaced tracks of shrews look like embroidery, stitching the snow together. Snow provides good insulation, and small mammals such as shrews, mice and voles create a system of tunnels under the snow. Sometimes rodents seem dazed by the brightness above the snow and run laps or figure eights when they pop up on the surface. On occasion, their trail abruptly ends, with the wing tips of the feeding hawk traced in the snow. The small, straight line footprints of a fox may cut across the prairie, as well as the larger track of coyote, deer or turkey.



SUMMER

WINTER

Observation Point #8: Middle Bridge



Look upstream from the bridge and you can catch a glimpse of the sedge meadow from which the stream drains. In the spring, you may hear frogs calling from this marsh but not from the lake. Fish avidly feed on the eggs and young frogs in the lake, but the marsh doesn't hold enough open water to support fish, so the frogs survive. Notice how small and shallow the stream is in relation to the height of the banks. The steep hill above contributes to this but the original streambed probably formed just after the glacier melted. At that time, a shallow kettle pond occupied the bowl above.

Observation point #7: Muir View Bridge

Pause at the bridge for a moment and look around you. Upstream, to the north, is the site of the original Muir family homestead. This must be the stream that John Muir speaks of in his book, "Stories of My Boyhood and Youth" and represents the area that sparked his first efforts at preserving land for its intrinsic beauty.

Look back on the trail. Perhaps you can see the rich black soil showing through where the vegetation has been worn down. Now take a close look at the plants. The red-stemmed shrub, red-osier dogwood, helps stabilize the soft, organic soil with its roots. Osiers are also a favored deer food. The dogwood is moving into a sedge meadow, composed of one of the tussock or hummock sedges. Sedge meadows grow on peaty or mucky soils that are normally saturated but rarely covered by water. They also benefit from fire, which sets back invading woody vegetation, such as the dogwoods. The hummocks are formed of dead but undecayed fibrous roots and rhizomes. As the plants age, the hummocks grow higher, up to 30 inches.

Turn around and look downstream. If it's late spring or summer, the bright green of the tamaracks will catch your eye. In the fall, the tamarack needles will have turned to bright gold, and by winter the needles will have fallen, leaving only the characteristic knobby leaf buds as a means of identification. Tamaracks are a bit of a paradox. They belong to the coniferous group with pines and spruce, but act like deciduous trees and drop all their needles in fall.

Observation point #5: Oak Grubs

As the prairie narrows into marsh, the trail approaches a line of oak trees that may have been the edge of a field on the west end of the original Muir property line. A number of the trees in the hedgerow have several trunks. These trees are survivors from a time when fire regularly swept the landscape, killing the tops of the oaks. The roots, however, survived the fires, and because the dominant growing bud had been destroyed, the plant re-sprouted with multiple stems. When the fires stopped, the trunks seen today were able to reach maturity.

The closest multiple-stemmed tree to the trail is a burr oak. Burr oaks develop a very thick, deeply grooved bark as they grow. This thick layer of bark insulates their growing tissues from the heat of fires, and allows them to survive in a fire-prone landscape. Burr oaks have multi-lobed leaves almost a foot long with rounded tips.

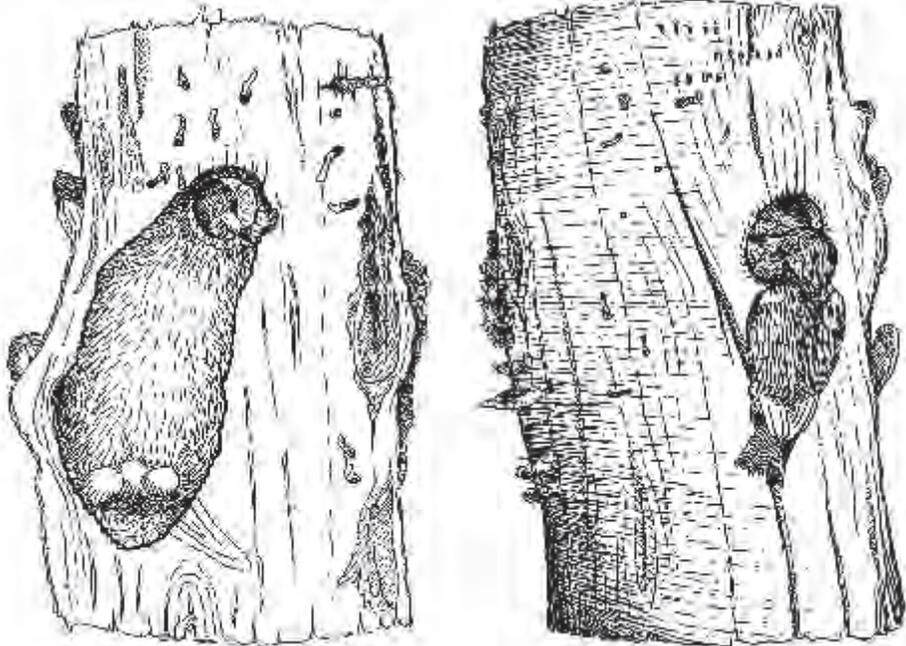
Adjacent to the burr oak is a black oak, and a few feet away on the outer edge of the hedgerow is a shagbark hickory. Black oak can also be found in this linear grove. White oak, another fire-tolerant species, is also found along the trail.





Adult Shagbark hickory trees are characterized by the strips of peeling bark from which they get their name. The large leaves are made up of 5-7 leaflets, and their nuts, although difficult to crack, were a major source of food for Native Americans. Squirrels, mice and other wildlife feed heavily upon them. Hickories and other nut bearing trees often produce only on alternate years, an indication of the tremendous amount of reserve required to produce the nuts.

Toward the lake are a number of dead oak trees. These may have been killed by oak wilt, a non-native fungus that is increasingly affecting local oaks. Standing dead trees like these may not look all that pleasing to the human eye, but for some birds, especially woodpeckers, they offer a multitude of meals, and a potential home. Hidden beneath the



flaking bark are a variety of insects feeding upon the decaying wood and bark. Woodpeckers chisel away the bark and wood to feed on these fat-rich larvae. If the tree is infected by a heart rot fungus, woodpeckers may hollow out a hole to use as a nest. In future years, chickadees and other birds that are ill-equipped to carve their own nest hole will claim the old woodpecker nests for their own.

Observation point #6: Bench at the Savanna Restoration

Around the bench area is a good example of a restored oak opening. See how the trees are widely spaced, with an open understory? A few years ago, the red cedar, cherry, and other woody species that normally would have been killed by naturally occurring fires were removed by the Park's land stewards.

Ecologists believe that the different types of oak savannas, including oak openings, originated when prairie fires spread into surrounding closed oak forest with enough intensity to create open canopy conditions or when oaks invaded prairie during prolonged lulls in the occurrence of fire. The flora of savannas is a mixture of prairie and forest species, with prairie forbs and grasses more abundant in high light areas and forest forbs and woody species in the areas of low light. In fact, many plants are "savanna specialists" that thrive in the mottled light conditions provided by the scattered oak canopy.