



*M*acnamara
Field Naturalists'
club

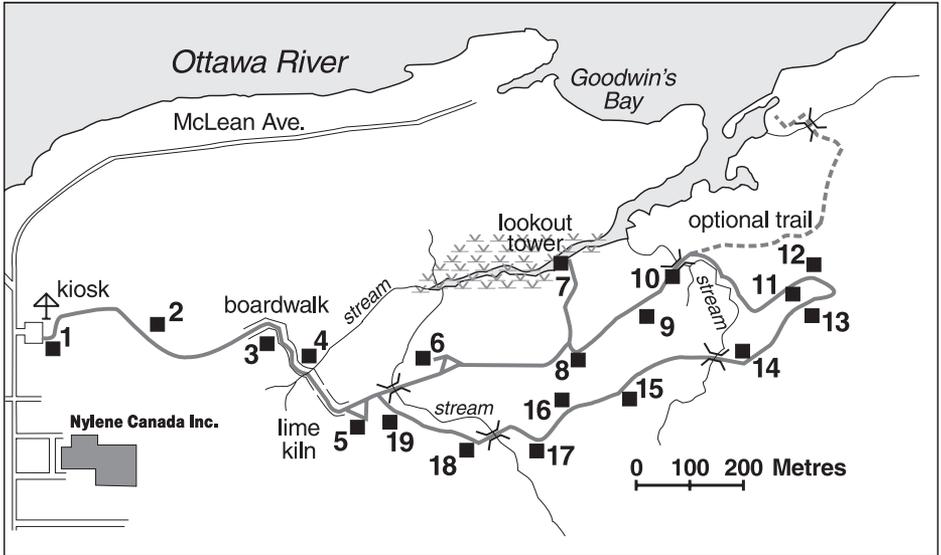
A small, detailed line drawing of an orchid flower and its stem, positioned to the left of the text. The drawing shows the intricate structure of the flower, including the petals, sepals, and the central column.

THE MACNAMARA NATURE TRAIL



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Welcome to the Macnamara Nature Trail! This trail, a project of the Macnamara Field Naturalists' Club, has been made possible by Nylene Canada Inc., which has kindly granted permission for this trail to run through its property, and the K.M. Hunter Foundation, the principal funder of the project.

The Macnamara Nature Trail is an interpretive trail with 19 numbered stops where accompanying text in this booklet will inform you about the natural or human history of each location. The trail is approximately four kilometres long with an optional one-kilometre (round trip) branch that leads to a rocky point overlooking the outlet of the marsh. The main trail is marked with blue-and-white hiking symbols and there are several benches along the way where you can rest, read the guide, or just contemplate what you have seen. If you decide to walk only part of the trail, the way back is marked with blue arrows. As there is Poison Ivy along a few sections of the trail and biting insects will likely be encountered in summer, long pants, appropriate footwear and insect repellent are recommended. Please respect the rules listed at the trailhead kiosk.

Enjoy your outing!

STOP #1 On the Trail of Macnamara

You are about to set foot into the favourite haunts of Charles Macnamara (1870-1944), one of the greatest naturalists and photographers of his time. In 1885, at the tender age of 14 years, Charles began to work as an accountant for the McLachlin Lumber Company here in Arnprior. He performed this role, and later that of secretary-treasurer, until the company's closure in 1936. During those years, Macnamara had but one day a week off – Sunday. Virtually all of his free time was spent roaming the forests, fields and swamps in the vicinity of this trail. Macnamara's walks led him from his home on Daniel Street in Arnprior through these woods to the family cottage at Marshall's Bay. The plants and animals encountered on his outings were diligently recorded in diaries lavishly illustrated with photographs of the subjects.

Charles Macnamara's interest in Nature was diverse. While beavers and orchids particularly intrigued him, all living things captured his attention. In 1913, Macnamara, along with Ligori Gormley, initiated the Arnprior Christmas Bird Census. Macnamara would search (usually on snowshoes) for birds all through this area to Marshall's Bay while Gormley would travel west to Braeside. The accompanying photograph, taken not far from here, was a self-portrait from the 1925 Bird Count, appropriately titled "The Bird Census Taker's Christmas Dinner."

Creatures much smaller than birds also caught his keen eye; of note were tiny soil inhabitants known as Collembolans or Springtails. Macnamara discovered no fewer than six species of these minute, jumping insects, some of which are known as Snowfleas. The scientific name of one Springtail, *Sminthurides macnamarai*, gives due recognition to its finder.

Macnamara's knowledge of Nature was equalled only by his skill with the



"The Bird Census Taker's Christmas Dinner"

camera and in the darkroom. Many of his photographs are regarded as the finest documentation of the early lumbering industry in Canada. His outstanding nature photographs recorded rare orchids and microscopic creatures, many of the latter captured on film or glass plates for the very first time. He became renowned for his novel photographic printing techniques, and the United States Library of Congress approached him to patent one of them.

Perhaps what is most remarkable about the man is that Macnamara was completely self-taught. He achieved a degree in science from Cornell University through correspondence courses. Fluent in French from an early age, he mastered German so that he could read science and photography books written in that language. In his lifetime, he corresponded with some of the greatest ornithologists, entomologists, zoologists, photographers and even contemporary writers, such as Joseph Conrad. In so many ways, Macnamara was an extraordinary man.

Many of the special natural features highlighted on this trail were discovered by Charles Macnamara nearly a century ago. It is only fitting that this trail and the club that built it bear the name of one of the greatest naturalists to walk through any wild region in past or present times.

STOP #2 In the woods of the Nopiming

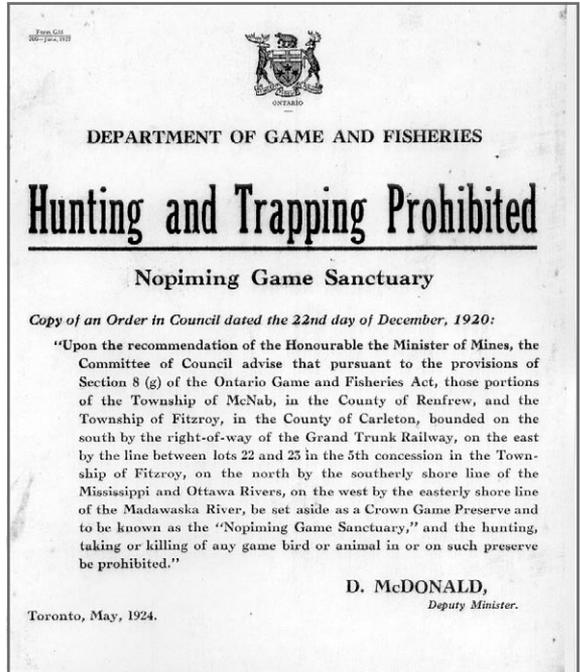
By the early 1900s, beavers had become quite rare in Canada. The trade in their furs, which was responsible for much of the exploration of this great country, had taken a severe toll on their numbers. Thus, it was with great excitement that Macnamara documented a colony in a pond a few kilometres east of this stop. Macnamara spent many hours fruitlessly waiting by the pond for a glimpse of its makers. A reflection of just how rare and elusive beavers were in his lifetime, Macnamara's unpublished manuscript, entitled *Beaver technics: a study of the working methods of a beaver colony 1918-1932*, contains numerous photographs of beaver structures, signs and habitat, but not one of the animals themselves.

Charles Macnamara felt that beavers and other scarce creatures that dwelt in these woods and waters would have a much better chance of surviving and propagating if they were protected. After gaining the agreement of the local landowners, he lobbied the Ontario government to declare their lands a game sanctuary. On Dec. 22, 1920, an Order in Council in the Provincial Legislature was issued. It declared the land bounded to the north by the Mississippi and Ottawa rivers, to the east by the line between lots 22 and 23 in the fifth concession in Fitzroy Township, to the west by the Madawaska River and to the south by the Grand Trunk Railway (later, the Canadian National Railway) was henceforth a Crown Game Sanctuary.

Macnamara named it the Nopiming Game Sanctuary. "Nopiming" is Ojibway for "in the woods," and is taken from the

expression "No-pim-ing en-dad ondji ja-wen-imid." This translates to "the dweller in the woods is always happy." For at least one day of each week, Macnamara was a very happy man indeed.

The Nopiming Game Sanctuary remains a Crown Game Preserve, the only one in the province solely on private land.



The Order in Council proclaiming the Nopiming Game Sanctuary

STOP #3 Slippers in the swamp

Macnamara was captivated by wild orchids and spent much of his time in the Nopiming Game Sanctuary, both before and after its inception, seeking these plants. One of his favourites was



Showy Lady's-slippers, from Macnamara's unpublished manuscript, *Some Orchids of Eastern North America*

the spectacular Showy Lady's-slipper, an orchid that still flames its stunning colours in this and a few other locations in the Nopiming.

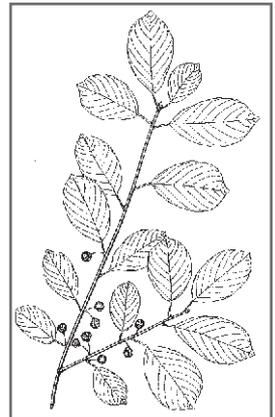
As in all Lady's-slipper orchids, the Showy Lady's-slipper has one petal enlarged to serve as a landing platform for its insect visitors. The pink to red pouch, open at the top, is designed to enlist large bees as pollinators. Once inside the "slipper," a bee soon learns that no edible reward is there. To escape, the disappointed insect must climb up the back of the pouch, aided by a ladder of hairs. As it nears the two exit holes, the bee finds both routes partially blocked by an elegant structure called the staminode.

The bee squeezes under this barrier, and as it moves along, a scraper pulls off any pollen it is carrying from an earlier visit to another Lady's-slipper. As it struggles to freedom through either exit hole, a mass of sticky pollen quickly attaches to the insect taxi. When the laden bee arrives at another slipper, the pollen load is pulled free as the insect repeats its crawl to freedom.

As with most wild orchids, Showy Lady's-slippers are nearly impossible to transplant into cultivated gardens for they require a special soil fungus for germination and are quite demanding in their habitat needs. Even when the proper moisture, temperature, sunlight, soil and fungus requirements are met, orchids can be desperately frustrating to grow, especially from seed. In the case of this species, it can take up to 17 years for the spectacular blooms to appear after germination!

To enjoy the Showy Lady's-slippers in full flower, you must venture along this trail between late June and mid-July. At other times of the year, look for this plant's brown seed cases, elevated on tall stalks, peering out from hidden recesses.

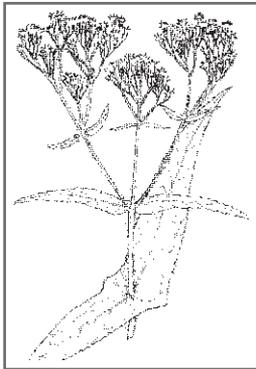
In this site, the Lady's-slippers are struggling to survive. Glossy Buckthorn, a non-native, invasive shrub, is taking over and shading them out. Some clearing of the Buckthorn may be necessary to ensure the orchids continue to flourish.



Glossy Buckthorn

STOP #4 Stream of life

This little stream eventually flows into Goodwin's Bay on the Ottawa River. It has been widened and deepened into a canal by beavers, animals that have become quite common since Macnamara's days. The canal leads to a small pond farther upstream where a lodge (beaver house) was once active. Beavers still live in this region but in recent years have resided in lodges out in the marsh, to which this trail eventually leads.



Blue Vervain (top left), Joe Pye-weed (top right) and Boneset (right)

Beavers build dams for a couple of reasons. First and probably foremost, they need water near the lodge that will not freeze to the bottom during winter. Beavers do not hibernate but remain active all winter, leaving the lodge to swim under the ice when they need food. A stockpile of branches bearing edible bark is usually stashed near the lodge. Secondly, a flooded area allows beavers to access their favourite food – the bark of Poplars and other trees – over a large area still within a short distance of the safety of water.

Streams like this harbour a great many wildflowers in summer. Here, the delicate spikes of Blue Vervain, the white heads of Boneset, the rose cups of Swamp Milkweed, the orange goblets of Jewelweed, the pink wisps of Joe-pye Weed and the flaming spires of Purple Loosestrife create nothing less than a Monet masterpiece.

In summer you could easily overlook a much less obvious flower. The mat of green that covers the water's surface is not algae but the floating leaves of a tiny flowering plant called Duckweed. True to its name, this plant is eaten by ducks, as well as small animals.

STOP #5 Marble-ous hot rocks

The Nopiming Game Sanctuary is situated on rocks that are part of the vast Canadian Shield. Over a billion years ago, relatively early in the Earth's history, these rocks were subjected to incredible heat and pressure during major periods of mountain-building. These physical stresses modified the rocks existing at that time into the metamorphic rocks found here today.

There are a number of metamorphic rock types, but here in the Nopiming Game Sanctuary many of the exposed outcrops are marble. Marble is metamorphosed limestone, a relatively soft rock, high in calcium content. Not only is limestone readily modified by chisel, it is also easily transformed by fire. In front of you lies an old lime kiln in which either limestone or marble was burned to produce lime. Inside this igloo-like structure large piles of wood were stacked up. On top of this were dumped loads of calcium-rich rock broken into small chunks by sledgehammers. The wood was set on fire, and after days of burning (additional fuel was probably added through the little doorway at the front of the kiln) the charred rock was removed. When water was added to the burnt rock, it produced a product known

as "slaked lime." This product could be used as cement or paint.

This lime kiln was built by the McLachlin Lumber Company sometime in the mid-to-late 1800s. The burnt rock was taken away by horse and cart, and buried in the ground near the company's lumbering operations along the Ottawa and Madawaska rivers. Whenever slaked lime was needed, the stockpile was dug up. Water was added to the burnt rock, as well as another agent known as "Recketts Blue." Barrels and buildings were painted with the resulting paint, known as whitewash, which acted as an antibacterial agent as well as a beautifying coat. Slaked lime was also used as mortar in foundations and brickwork. The McLachlin Lumber Company shut down in the mid-1930s, but the activity at this lime kiln likely came to an end well before that time.

As you leave this platform and walk back to the main trail, look to your right. Many of the rocks bear irregular and sharp edges, suggesting that dynamite was used to initially break the outcrop into workable pieces. Thus, Nopiming marble rather than sedimentary limestone may have been burned in this kiln.

STOP #6 The rock walkers

At the last stop we learned that many of the rocks exposed along the trail are Precambrian marble. Here is a beautiful little escarpment of that same rock type.

A number of plants grow only in calcium-rich soils and are known as "calciphiles." While some thrive in soil that lies atop limestone or marble, a few calciphilic plants grow right on the rock itself. Beside this viewing deck a special calciphilic plant adorns much of the

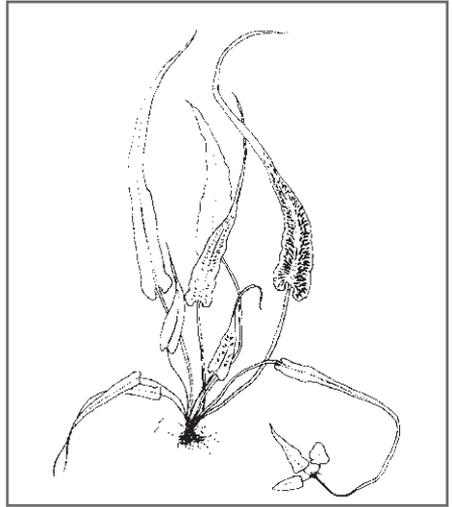
surface of the exposed rocks of this escarpment.

The long, thin, green "leaves" that carpet several of the largest rocks are actually the fronds of a rather rare fern. While this fern reproduces with traditional seed-like spores held in cases on the underside of the fronds, it also has another, rather unusual, way of producing offspring. Wherever the long, pointed tip of a frond touches down, a new frond can

sprout up. This too can have another frond grow from where its tip makes contact with the soil, and so on and so on. A parent plant can thus create several generations of fronds by this method, which is known as vegetative reproduction. Because this plant spreads by taking these vegetative “steps” across the rock, it is appropriately named the “Walking Fern.”

Macnamara initially discovered and photographed this colony of Walking Ferns a century ago. However, decades of searching in more recent times failed to relocate the ferns until an Arnprior naturalist accidentally stumbled across this escarpment one winter. Gordon Vogg was following a porcupine’s trail in the snow when it led him right to these rocks and Macnamara’s Walking Fern.

If you look under the large slab of rock that touches the ground just ahead of the viewing deck, you will see a large pile of “dirt” made up of oval brown objects. These are Porcupine droppings, accumulated over the many years the animals denned in this cavern.



Walking Fern

When you return to the top of the stairs, be sure to walk straight ahead and follow the blue markers out to the main trail, where you will turn left to continue your outing.

STOP #7 A habitat flush with life

From this vantage point you can see the great marsh that extends out to Goodwin’s Bay to the right. The stream in the centre (where yellow Bullhead Lilies grow) is the same one you crossed earlier on the boardwalk. Like all true marshes, this one floods in the spring when the water in the Ottawa River rises. The periodic flooding and drawdown (when the waters recede) is important to the ecology of this and all marshes. The flooding brings into the marsh a flush of nutrients from the river, and the drawdown exposes decaying organic matter to the air, allowing for more complete decomposition by bacteria, which require oxygen for their work.

However, this great system is changing. Currently, the spring flooding does not cover the marsh with as much water as it once did. Sedimentation has raised the level of the bottom and several types of plants are changing the habitat. To the near side of the stream, many types of sedges including bulrushes are growing, some forming tussocks. On the far side of the stream, cattails have formed a dense wall. Through time, as the plants die and add more organic material to the bottom, and the mats of cattails and other dominant plants continue to grow and spread, the marsh will support more shrubs and eventually trees. When this happens, the transformation from a water-filled bay to

a marsh and finally to a swamp forest will be complete.

Presently, a number of shrubs and small trees are creeping into the marsh. Near this tower you can see Hoary Willow, Black Ash, Speckled Alder, White Cedar, Spiraea and, yes, Glossy Buckthorn advancing towards the stream. Because of the great mixture of plants, from this tower you can hear and see birds that are typical of either

marshes or swamps. (all swamps are treed.) The dry loose trills belong to Swamp Sparrows, a misnamed bird quite at home in cattail marshes. An abrupt “wee-bee-oh” informs you that Alder Flycatchers have found the shrub content suitable for their needs. A flash of yellow announces the arrival of a Yellow Warbler, a bird that thrives in this intermediate stage of marsh-to-swamp succession.

STOP #8 In a forest, diversity is the spice of life

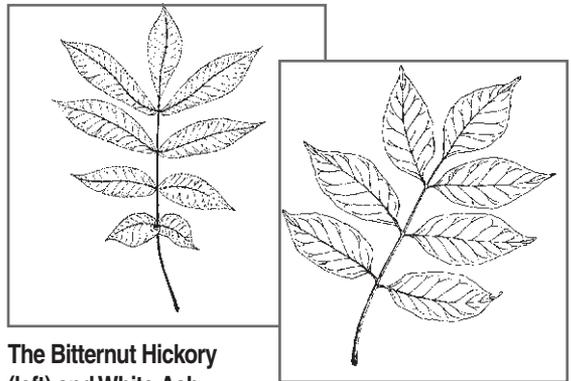
Here the trail travels between two magnificently straight, tall trees, one dead, the other still living. While at first glance both might appear to be similar, upon closer examination you will see differences in the bark. The dead one on the left has diamond-shaped hollows between the raised bark ridges while the tree on the right has low, flattened ridges surrounding the low spots.

The tree on the right is a White Ash and the tree on the left is a Bitternut Hickory. If you have binoculars, you can see the hickory leaves, and the illustration shows the ash leaves as well. Both trees rarely form solid stands and are most commonly encountered as casual components of a mixed forest such as we have here.

Diversity in a forest is natural and important. Each kind of plant is food for a number of animals. If a plant is found in great abundance, periodic outbreaks of its predators may occur and these can have a devastating impact. However, if a species is found in lesser abundance and is situated in a group of other species, insects and other predatory animals tend to occur in smaller numbers and the odds of an outbreak are much reduced. Additionally, as each

type of plant supports its own specialized animals, the greater the mixture of trees in a forest, the greater the biodiversity found in that habitat.

In reforestation efforts, planners often ignored this important principle and planted large areas with a single species of tree. These monoculture plantations are often besieged by outbreaks of insects and



The Bitternut Hickory (left) and White Ash

other animals. Those that grow to mature forests end up supporting a disappointingly low diversity of living things.

Not only do animals feed on the leaves of trees; fruit and nuts are also eagerly consumed by many hungry mouths. But herein lies a major difference between these two species of trees. White Ash seeds are devoured by a number of

animals, including Bohemian Waxwings and Evening Grosbeaks, late fall and winter visitors to the Nopiming Game Sanctuary. However, Bitternut Hickory nuts are avoided by most creatures. The

bitter nuts that give the tree its name dissuade most animals from dining on them. Apparently even Grey Squirrels eat them only as a last resort!

STOP #9 Greatness can be a fleeting concept

Look up, way up, and you will see the crowns of the tall, smooth-barked Largetooth Aspens, or Poplars, beside the White Birches. Then look down, way down, and you will see the dark green foliage of Ground-Cedar Clubmoss by your feet. If asked which species is most successful, you might be tempted to say the Poplars, for they are huge and tower above the creeping clubmosses.

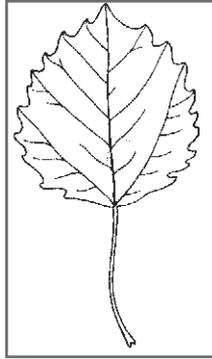
While the Poplars currently appear to hold the upper hand, this was not always the case. Clubmosses have been around for a long, long time, making their first appearance nearly 400 million years ago. In fact, back in the days when old Tyrannosaurus rex was terrorizing the Earth, relatives of these pint-sized plants grew as tall as trees and formed great forests. It may come as no small surprise that the coal we burn and pollute the air with today was largely formed from the remains of the gigantic relatives of this small clubmoss in front of you.

It was not until about 65 million years ago, the time of the great dinosaur extinctions, that Poplars appeared on the scene. However, they had one big advantage over the clubmosses – and that wasn't size. Poplars were flowering plants that propagated via sexual reproduction and

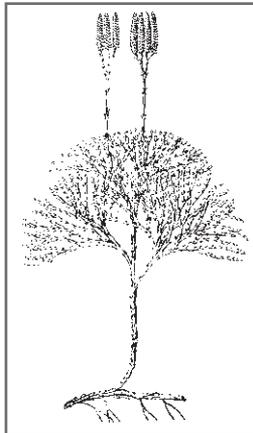
seeds. Clubmosses and their kin favoured the reliable but rather limiting method of asexual reproduction, which involves spores. As time slowly passed, the flowering plants (including the Poplars) were able to adapt to new conditions much more quickly than the clubmosses and other primitive plants. As a result, the status of spore-bearers shrank while that of the Poplars and other flowering plants soared. Today, the flowering trees tower high above while the clubmosses and their spore-producing relatives are exiled to lesser (but still important) roles in the understory of forest ecosystems.

Now back to the original question. Which plant is more successful? In terms of longevity on this planet, the answer would be “the clubmoss.” But in terms of present status, you would have to declare it a draw because both plants are here and thriving in the Nopiming Game Sanctuary.

If you look at this colony of Ground-Cedar Clubmoss, you will see occasional candelabra-like structures rising above the evergreen leaves. These finger-like projections, called strobili, house the spores. In this Clubmoss species, most strobili appear in groups of four.



Largetooth Aspen



Ground-Cedar Clubmoss

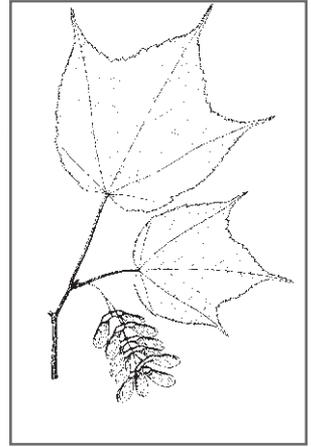
STOP #10 The shady characters of Hobblebush Hollow

Before you head onto the bridge and enjoy the delicate frills of Meadow Horsetail, look at the large leaves adorning the shrubs growing on both sides of the trail. You will notice two quite different types. One is rather rotund and lacks any indentations except small teeth. While the other is also large, it has three distinct points to its shape. The bark of these two shrubs is also different. The shrub with the three-pronged leaves owns a trunk prominently striped green and white. The other has a comparatively unremarkable trunk.

The shrub with the more intricate leaves and colourful trunk is Striped Maple; the plainer shrub is Hobblebush. While Hobblebush might appear to be the ugly duckling in summer, the same cannot be said in mid-May. At this time the gorgeous white blossoms of this shrub liven this low, cool site. As striking as those of any wildflower, Hobblebush flowers are also quite complex. They consist of an outer border of sterile (lacking sexual parts) large-petalled, snow-white flowers that surround a central cluster of smaller flowers bearing sexual parts. The purpose of the sterile flowers is unknown, but it is speculated that they play a role in the attraction and guidance of insect pollinators.

Striped Maple and Hobblebush own large leaves for a good reason. In the shade in which both species grow, large leaves help to collect the sunlight needed to manufacture sugars via the magic of photosynthesis. When large leaves are borne parallel to the ground, as they are in both species, even more of the scant sunlight can be captured and put to work.

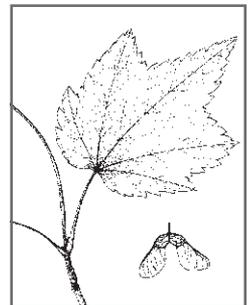
There are other shrubs of interest at this site. The much smaller and blunt



Hobblebush (left) and Striped Maple (right)

leaves of Mountain Maple, and the shiny leaves of Glossy Buckthorn can be seen near this end of the bridge (as well as along the escarpment at the Walking Fern site). Because this ravine owns a cool, moist microclimate (as does the Walking Fern site), plants such as Hobblebush, and Striped and Mountain Maples can grow, along with some spectacular Jack-in-the-Pulpit plants.

Be aware that at the end of the bridge the main trail swings sharp right while the optional trail that leads to a viewing area carries on straight ahead. After you pass the ravine on the main trail, go across and do not turn onto the old Lower Brown Farm Road at that junction.



Mountain Maple

STOP #11 Between a rock and a low place

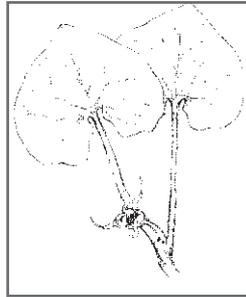
The trail once again visits a rock escarpment. Here, however, you will not find Walking Fern. Instead, the ferns you see gracing the cliff are more complex in form. Most of these are Marginal Shield Ferns, named in part for the position of their spore-bearing cases. These cases hug the edges or the margins of the undersides of the frond's lobes.

Just below the ferns and all along the low part of the trail you will see a great number of wildflower leaves. The greatly lobed ones belong to Bloodroot and the heart-shaped leaves are those of Wild Ginger. While both are spring bloomers, the resemblance stops there.

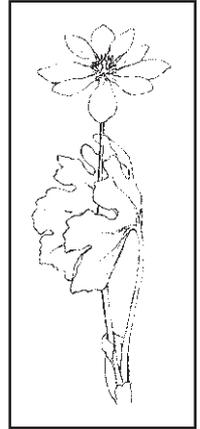
Wild Ginger bears a small, vase-shaped, wine-coloured flower that hugs the ground. To see it, one often has to lift up its large leaf. Emitting an odour not unlike that of a decaying mushroom, this species lures in tiny insect pollinators known as Fungus Gnats. These small flies seek fungi on which to lay their eggs because their minute maggots devour mushroom flesh. Deceived by the clever ruse of the Ginger, the flies roam around,

spreading pollen for the flower but failing to find the fungus flesh they seek. In late summer look for rolled up leaves – the work of certain caterpillars and other “leaf rollers” including spiders.

Bloodroots, named for a red juice that copiously flows from broken roots and stems, bear showy white flowers that attract a variety of insects. However, just in case the pollinators fail to appear in the early season in which this flower blooms, the flowers are self-pollinating to ensure seeds are produced.



Wild Ginger



Bloodroot

STOP #12 Here today, gone tomorrow

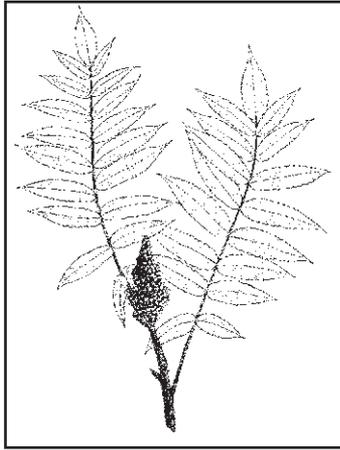
We tend to feel more comfortable when things around us remain the same, and often are more than a bit resistant to change. However, in Nature, change is the name of the game. Right in front of you is an impressive stand of Staghorn Sumac. Many of the plants have reached maturity as small trees and have formed a mini-forest in this site.

But this was not always a forest of sumac, nor will it remain one for much longer. At one time this was a field that was part of a farm owned by the McLachlin Lumber Company. On this site, still referred to as the Brown Farm

(after its keeper), horses were kept and crops were grown. Abandoned at least 75 years ago, this field was left to the whims of Nature. It is likely that one early spring an American Robin or some other bird flew over the field and left droppings. Sitting inside its dropping was the indigestible remains from a former meal – a seed of Staghorn Sumac. From the seed sprouted a colonizing shrub.

However, the shrub was not satisfied to wait for its seeds to take hold on this open site. It wanted to spread more quickly and did so hidden from view. Like a number of other colonizing species, Staghorn

Sumac is able to propagate vegetatively through its roots. Soon other sumac stems, all clones of the colonizing parent, began to sprout above the ground. If you look at this colony, you will see that the sumacs on the far side are all about the same height (a rather impressive six metres). The plants nearest you are only about a half that stature. This suggests that the first plant colonized the far side of the old field, and over the years gradually advanced to where you now stand.



Staghorn Sumac

Possibly you are looking not at a forest of hundreds of different sumac plants but perhaps at best only a handful of giant individuals with numerous stems all arising from the same root system.

But change is in the wind. While the sumacs presently own the field, there is evidence that their hold is slipping. Many of the oldest plants are showing signs of age and may be on their way out. If you look under them, you will see relatively few young sumacs coming up to replace them. Sumacs are sun-lovers, and do

not grow well in deep shade. Thus, when the oldest sumacs die and collapse, it may well be that some other plant will take their place. Perhaps it will be Sugar Maple or Basswood saplings, because all around the perimeter of the sumac patch these tree species are just waiting for a new site to sow their seeds. Only time will tell!

The fruit of Staghorn Sumac is eaten by nearly 100 species of

birds, particularly in late winter or early spring. Locally, Ruffed Grouse, Common Ravens, American Crows, American Robins, Pine Grosbeaks, Evening Grosbeaks and Eastern Bluebirds all feed on the bright red fruit.

When you continue on the trail, you will be walking along an old road that leads uphill to another portion of the Brown Farm. Be sure you turn right at the top of the hill.

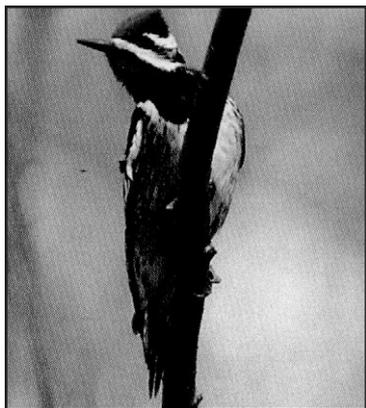
STOP #13 The hole-y wells of the Nopiming

You are standing in a small grove of Eastern Hemlocks. Beneath them you will find relatively few plants growing. This is because these soft-leaved, small-coned evergreens cast not only a deep shade but also a scattering of old needles that release growth-inhibiting chemicals into the soil. Few plants are able to resolve both these challenges.

While not popular with other plants, hemlocks are eagerly sought out by a number of birds. Blackburnian Warblers sing their wispy rising songs from the upper branches where they feed and nest.

In winter, Pine Siskins swarm the tiny cones to steal the even smaller seeds they house. But in early spring, the hemlocks belong to a Yellow-bellied Sapsucker.

You will see signs of this bird all over the bark of this hemlock. Neat rows of small holes reveal that a woodpecker has visited this tree. However, the woodpecker came here not to dig out insects from under the bark but to tap into a well of sweet liquid. The visitor was a woodpecker, which as the name suggests, drinks the sap of trees and shrubs. First, it drills neat rows of holes such as the ones



Yellow-bellied Sapsucker

here, then later savours the resulting sap. The tip of a Sapsucker's tongue has special brush-like filaments that soak up the sap like capillary tubes. When the long, extensible tongue is pulled back into the mouth, the sap is squeezed out.

The sap-oozing holes soon catch the eye (and tongue) of other animals. Flies, beetles, moths, wasps and butterflies are drawn to the sweet bounty. Some of these visitors end up as meals for the sapsucker. But a larger competitor is also drawn to the sap. Ruby-throated Hummingbirds regularly visit these wells. If the woodpecker is near at hand, it invariably tries to drive away the intruder. But hummingbirds are fast and agile, and often zip right around the trunk to steal another drink from directly behind the defender's back! This lasts until the sapsucker gets wise and once again puts the run on the hummer. Each spring in the hemlock stands of the Nopiming, many "hole-y wars" are waged over these "hole-y wells"!

Make sure that you turn right when the trail joins with the Upper Brown Farm Road, and follow it to the next two stops.

STOP #14 Even forests have control freaks

Thus far on the trail you have passed through a variety of habitats. Some, like the sumac patch, the Largetooth Aspen stand and even the marsh have been relatively young habitats that through time will change. In Nature, the process of change is inevitable and is known as succession.

But there are plants that do their best to stay in control, that throw out barriers to prevent other species from intruding into their domain. At the last stop we saw that hemlocks do this through shade and chemicals. Right here is another plant which exerts such great control that it often governs vast regions. This plant should be familiar to most Canadians for its leaf is emblazoned on our flag. It is, for those who haven't guessed, the Sugar Maple tree.

Many of the trees here and farther along the Upper Brown Farm Road are Sugar Maples. Under them are many maple seedlings. Sugar Maples not only



Sugar Maple leaf and seed

have the power to exclude other species from their domain but also to overcome the barriers they first put up.

Maples have two main ways of maintaining dominance. Their leaves form a dense umbrella-like canopy that is extremely efficient in preventing sunlight from reaching the forest floor. Few plants can grow in this dense shade. After their death, these same leaves exert a second form of control. Each autumn they tumble down until, like a blanket, they fully cover the forest floor. They fall in such numbers that the soil fungi and other agents of decay cannot keep up with the bounty, and ultimately several years' worth of leaves accumulates. Rain and snow compact the leaves into a dense mat that is a barrier to many seeds, even those of some plants that can otherwise survive in shade.

However, these maples ensure their continuance in the forest by producing seeds that have resolved both problems. Maple seeds are housed in winged keys that contain a large amount of stored food. This food is a lifeline for the sprouting seeds until their roots grow down through the leaf mat to the mineral-rich soil beneath. Once established, the root system will provide the seedlings with the raw materials needed to manufacture their own food.

While maple seedlings can survive in the dark shadows of their parents, unless more light becomes available, they can do so for only several years. Whenever one of the large trees falls down and creates a gap in the sun-blocking canopy, light floods the forest floor and a horde of young maples rises in response. While many shoot up to fill in the gap, ultimately only one will achieve the stature of its predecessor.

Even when the canopy remains intact and the light-starved maple seedlings perish, the control of the Sugar Maple trees is in no way compromised. The dead maples are continuously replaced by others that arise from the keys helicoptering down from the canopy above. In this fashion Sugar Maples retain dominance until a major perturbation, such as fire, comes along.

Once established, as they are becoming here, Sugar Maples will eventually take over. During their reign, this forest supports a number of hardwood forest birds, many of which are commonly encountered along the trail. Listen for the repetitive "see-me, here-am-I, up-here, in the tree" phrases of the Red-eyed Vireos, the lazy "pee-a-weee" whistles of Eastern Wood-Pewees and the "Robin-with-a-sore-throat" melodies of fiery Scarlet Tanagers.

STOP #15 A healthy forest is a lot of rot

The forest through which you have walked is truly a magnificent one. However, if you peer into the woods on both sides of this road, you will see holes in a number of the trees and also a few trees that are quite dead. Now, before you panic and go running off to find the local tree doctor, be advised that these apparent signs of ill health are actually indications of quite the opposite.

As trees age, their defences against the elements and the armies of insects and fungi begin to wane. When branches succumb to wind or heavy snows and break free from the trunk, the ensuing wounds soon begin to decay and hollows result. Woodpeckers, including the crow-sized Pileated that inhabits this game sanctuary, create other cavities as they dig out hidden grubs and ants or as they excavate their nest sites.



Pileated Woodpecker at tree cavity

sign over an appropriately sized opening. Birds, however, do not hold a monopoly on these living quarters. Mammals ranging

Cavities are nothing short of vacant apartments crying for tenants. It is never long before one of a wide array of animals takes up residence. In this forest, Wood Ducks, Barred Owls, Eastern Screech-Owls, Great Crested Flycatchers and White-breasted Nuthatches have at one time or another hung up an “occupied”

in size from diminutive Deer Mice and small Flying Squirrels to rotund Raccoons and portly Porcupines also inhabit cavities in this forest.

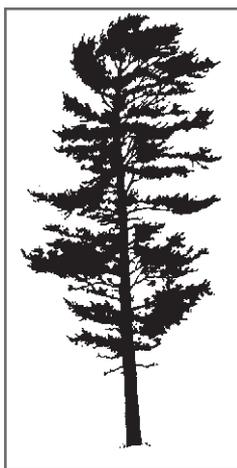
Once the trees surrender to the years and collapse onto the ground, they continue to be vital parts of the forest ecosystem, supplying nutrition to countless fungi, insects and other small organisms. One species of salamander, the Red-backed, uses the damp, dark confines of rotting logs not only as feeding sites but also as nursery chambers in which the females stash and guard their eggs. A dead tree, as is the case with any other deceased plant or animal, is never “wasted.” In Nature, the death of one provides life for a host of others.

Be sure to remain on the trail as it swings to the right off the Upper Brown Farm Road, heads down through the trees and once again crosses the Lower Brown Farm Road.

STOP #16 The vestiges of grandeur

Beside you is a rotting stump, all that remains of a giant White Pine. At one time, well over a century ago, it towered above all other trees in the forest. Its ample crown gently swayed as each branch rose and fell, keeping time with the ageless rhythm of the wind. It whispered secrets of life to the early peoples who revered its spirit. It stood silent watch as Samuel de Champlain and the first wave of European intruders paddled their way up the Ottawa River. Then one day it felt the bite of a logger’s saw.

White Pines were the trees that drew the first settlers to this region. England



White Pine

was waging a war against Napoleon and desperately needed tall timbers to refurbish her battered navy. The Ottawa Valley, with its gigantic White Pines, provided the necessary raw materials. At its prime, this White Pine was likely well over 33 metres tall and more than a metre across at the base, not quite as large as the original pines used as masts for sailing ships.

From the early White Pine timber era grew an important forest industry. Arnprior’s status as an insignificant little hamlet changed dramatically with the arrival of Daniel

McLachlin, an important lumberman and politician. In 1862, McLachlin

established the first of four water-powered sawmills at the newly incorporated Village of Arnprior. By the early 1900s, up to a thousand men, including Charles Macnamara, were employed by the McLachlin Lumber Company.

In 1881, Richard Macnamara, Charles' father, was hired by the McLachlins as secretary-treasurer, and in that year moved his wife, Richianna, his son, Charles, and Charles' three surviving siblings (his twin brother Dickie died from typhoid) from Quebec City to Arnprior. Four years later, at age 14, Charles left high school and immediately followed in his father's footsteps. It was during his 52-year tenure

with the McLachlin Lumber Company (first as accountant, later as secretary-treasurer) that Charles Macnamara's remarkable photographs of caboose camps, river drives and other images of the early logging industry in Canada were taken. Also during those years, most of his exploration and documentation of the flora and fauna of this region were done.

Indirectly, then, this White Pine and its kin were responsible for Charles Macnamara coming to Arnprior. While the importance of this individual tree might be gone, the significant contributions of Charles Macnamara, including the Nopiming Game Sanctuary, live on.

STOP #17 A mystery in the woods

You can see that this part of the forest is quite different from the section through which you just walked. It is plateau-like and relatively free of trees. Is there something foul in the soil that prevents plants from growing? Was there some sort of catastrophe that removed all the trees that once stood on this site?

If you look around, you will find clues that help solve this mystery. One is the nature of the land here. It is oddly flat in comparison to the rest of the terrain in the Nopiming Game Sanctuary. The slope to the small stream just ahead is rather steep and not very natural in its grade. The second clue is the maple at this stop. It bears not a single main trunk but a number of equal-sized trunks all sprouting from a common base. The final clue can be seen when you examine this and other trees around the perimeter of the open area. On many of them you will find thin scar lines about eye level. These three clues are all that you need to at least partly resolve this mystery in the woods.

First, the multi-trunked maple. This tree has been cut off and allowed to

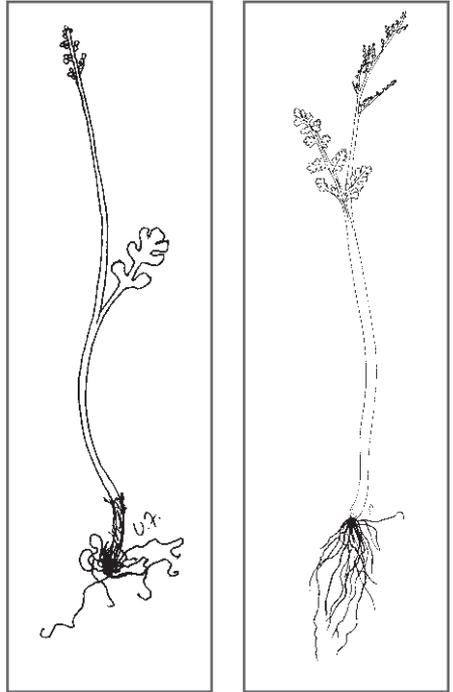
regrow in an open situation. With ample sunlight, the numerous shoots that sprouted from the stump eventually grew to full-sized trunks. So we know that this site was once cleared of trees and this one, when it sprouted new trunks, was allowed to live and grow.

Now, the scars. You will notice that they are almost all the same in width and generally appear in fairly regular spirals around the trees at the edge of this opening. It would appear that some sort of material was attached to these trees for a long period of time and as the trees grew thicker, the foreign object refused to expand with them. These scars were likely caused by fence wire. It is quite possible that the fences kept horses or livestock enclosed in this area. As for the flatness of this site, it seems likely that, once cleared of trees, fill was added to create a level area for the enclosure that once stood here.

Time has masked many of the changes that man has inflicted on the Nopiming. As the years continue to pass, the human fingerprints will be more completely

erased. Left to her own design, Nature heals the scars and refurbishes the land.

There is yet another sign that there has been a disturbance in this part of the forest. If you look closely at the ground in summer, you will find minute ferns (10 centimetres tall) known as Grape Ferns. Here, at least two species, the Daisy-leaved Grape Fern and the much smaller and rarer Least Grape Fern, can be found. Their tiny spore-containing structures, which resemble miniature clusters of grapes, are often found along old cart trails, abandoned logging roads and other disturbed areas in rich hardwood forests.



Least Grape Fern (left) and Daisy-leaved Grape Fern (right)

STOP #18 The enduring spirit of the nopiming

This part of Ontario has seen many changes over the course of time. Billions of years ago, great upheaval and shifts occurred in the Earth's crust, resulting in highlands and cliffs, lowlands and valleys, and huge cracks called faults. The latter gave us the Ottawa Valley. Four hundred million years ago, great seas flooded this region, leaving behind sedimentary limestone and a wealth of fossils. Several times over the past million years, mile-high ice sheets scoured this terrain during the Great Ice Ages. Eleven thousand years ago, salt water once again covered this region as the Champlain Sea, on the heels of the retreating glaciers, invaded land

depressed by their weight. In more recent history, armies of loggers pillaged the forests of their rich bounty.

The presence of young White Birch along this final part of the trail reveals that yet another element of change has passed through the Nopiming Game Sanctuary at some point in its history. White Birches are pioneer, colonizing species that thrive in open, sun-drenched sites. Here, quite clearly, all the original trees were removed by some major force, making conditions right for the growth of the birches.

So what cleared this area of all its original cover? Was it the sons or even the grandsons of the loggers who removed the

giant White Pines from this forest? Was it a powerful natural force such as a great wind or an outbreak of insects?

There is another possibility. Fire, a natural and powerful ecological conveyor of change, often sets the stage for an invasion by White Birch and other pioneer tree species (including Poplars). It may well be that a fire coursed its way through here, creating the ideal conditions for this even-aged stand of White Birch to become established. Through time other trees will sprout under the birches, for they cannot grow in their own shade. It is likely that if succession continues under natural conditions, Sugar Maples will eventually

come in and take over the forest. Once again, change is a very natural part of forest ecology.

Over the course of history, many changes have fallen upon the Nopiming Game Sanctuary. In the future, many more are likely to occur. Whatever happens in the years to come, you can be sure that the indomitable spirit of the Nopiming, the spirit that captured the heart of Macnamara and all those who walk in his footsteps, will endure.

May the Nopiming have touched you with a bit of its magic on your outing today, and may you return to share more of its secrets in the days ahead.

STOP #19 Full circle

We hope that you had a most enjoyable walk around the Macnamara Nature Trail. You will soon meet up with the main trail (just past the lime kiln) where you will turn left to return to the parking lot. This trail guide can be dropped off in the return box at the kiosk or kept as a souvenir. A small donation towards its cost would be most appreciated. Mail contributions to:

The Macnamara Field Naturalists' Club
P.O. Box 391
Arnprior, ON K7S 3L9

For more information about the trail or the club and its activities, we're online at
www.mfnc.ca