Brûlé

Self-Guiding Trail

Riding Mountain National Park

Take only pictures—leave only footprints

The Brûlé Nature Trail

The Brûlé Nature Trail is situated on the north side of #19 Highway 0.6 miles east of its junction with #10 Highway and 4.2 miles east of the Interpretive Centre in Wasagaming. The trail received its name from explorers and early surveyors of this region, "brûlé" being the French word for "burnt".

The Role of Fire in the Natural Community

The northern evergreen forest spreads across the top of North America from Newfoundland to Alaska. Plants and animals are the living threads which weave this green blanket together. Jack pine, black spruce, fireweed, twinflower, moose, snowshoe hare, white-throated sparrow, gray jay — all these are part of the pattern. They are found along this trail and almost everywhere else in Canada's northern evergreen forest.

The great changers in nature are man and fire. In the National Parks, such as Riding Mountain, natural forces are still dominant — thus fire becomes the most important factor in changing the appearance of the landscape. The effect of fire can be observed along the 1.31 miles length of this loop trail.

1. Lightning Strike

Dark clouds, rain, a flash of lightning! The boom of thunder mingles with the sound of splintered wood. Beside you stands the jack pine that was struck by this bolt of lightning. Fires burned over this particular area in 1929 and again in 1957. It is possible that the lightning strike you are looking at caused the more recent of these two burns.

For millions of years lightning has been the cause of most natural fires. An intense, direct strike turns the sap into a gas, blowing the tree apart like a bomb. More often the strike hits near the top of the tree and runs down to the ground. This is what happened to the tree you are looking at. The top has been destroyed and a slash is still easily seen on the trunk.

2. The Charred Remains

This 25-foot tall jack pine spar is conclusive evidence of the 1957 fire. Usually fire damage is not this severe. Most large pine trees will survive a fire but bear evidence of their ordeal in the form of "catfaces" — burnt areas extending a few inches to several feet up from the base of the tree in the shape of an upside-down V. Look for these scars as you walk along the trail. Soon you will easily recognize the signs of lightning and fires.

3. Fire in the Forest

Try to imagine a wave of fire being driven forward by the wind, thick smoke blotting out the sun, small trees and bushes burning like torches, old logs and stumps being consumed by flames. This was the scene where you are standing, at 8:00 p.m. on May 27, 1971. Over five acres were burned before the fire was brought under control

Charred pines remain as evidence of past fires.

by a crew of 24 men. The cause was a cigarette carelessly tossed beside the trail. This was a "surface fire" — the most common of the three types of forest fires. The others are "ground fire" and "crown fire".

The ground fire usually smoulders within thick layers of moss and humus. It creeps slowly forward, breaking out from time to time as surface fire. Surface fires are the least damaging type as they leave behind many islands of unburnt vegetation to reseed the area. The crown fire is the most devastating form. Leaping from tree to tree, it can quickly destroy an entire forest from the soil to the tops of the trees.

4. The Fire is Out

After a fire passes over an area is the land doomed? No! Nature begins at once to repair the damage. Rain washes the ashes down into the soil where they serve as nutrients. Seeds are blown in from nearby green areas. New shoots emerge from deeply buried roots. Within a few weeks green vegetation begins to cover the blackened ground — first grasses, then wildflowers, finally pine seedlings and aspen saplings.

Fireweed

Only a year after the fire there will be thousands of bright blossoms — fireweed, yarrow, paintbrush,

lilies, anemones, buttercups, strawberries, vetches, violets, asters and goldenrods. Trembling aspen and jack pine quickly assert their dominance. Within five years they may be five feet tall — a new forest has been born.

After a fire countless blossoms paint the landscape.

5. The Aspen Grove

These whitish-barked trembling aspens began growing in 1929 and have escaped all the fires since that time. Each year they shed millions of tiny seeds which are surrounded by tufts of long, white, silky hair. This "fluff" can blow for miles on the wind. At the same time aspen roots may produce "sucker" shoots where strong sunlight warms the forest floor. Each of these suckers can become a new tree. By these means aspens spread outward from isolated colonies. Once established they are the fastest growing of all our trees (as much as 44 feet in 20 years) and the best adapted for survival.

6. Enemies of the Aspen

How were these ugly scars formed on the trunks

of the aspen trees? Why do they reach a height of seven feet and not continue higher?

Food supply is one of the critical factors controlling the population of any animal species. The wapiti (elk) is an excellent example of how this control works. The Riding Mountain wapiti population grew from 500 in 1914 to 12,000 in 1946. But the winter of 1946-47 was a severe one with exceptionally deep snow and low temperatures. In late winter several thaws and freezes produced thick crusts on the snow. Under these conditions the wapiti became desperate for food and began to chew the bark off aspen trees, a starvation food not normally included in their diet. During that one winter over 2,400 wapiti died, mostly from starvation, and by 1949 the population had dropped to about 5,000. These scars are a reminder of those difficult years.

Once the bark of the aspen is open, the tree is subject to infection from many sources — mostly fungi and insects. Woody brackets on aspen trunks are the spore-producing bodies of the false tinder fungus. Over 50 percent of these aspens have heart-rot because of this one disease agent. Wind storms often snap off these infected trees at their weakest point — the original wapiti scar.

7. The Jack Pine Stand

This grassy grove of mature jack pines shows the typical condition of this species when it has survived logging and fire for over half a century. Straight trunks rise upwards from 55 to 70 feet. Sunlight and breezes filter through the branches creating a pleasant environment for man and wildlife.

Originally, this was a dense stand of seedling pines striving straight upward toward the sunlight. Each year some of the weakest members of the group lose out in the struggle. The few that remain today are the strongest, the best adapted for survival.

Farther along the trail you will see young jack pines fighting for sunlight in the dense grove, just as these trees did more than 50 years ago. Any jack pine over 60 feet high is at least 70 years old and those over 70 feet are probably 100 years

old. Perhaps this stand got its start in life after the period of 1885-89 when immense fires raged uncontrolled over Riding Mountain.

8. The Life of a Pond

You have seen the effect of fire on the forest community. Now, what about the water community? Changes, over a period of many years, occur in water just as they do on land. This orderly sequence, regardless of where you find it, is known as "succession".

From the day this pond was formed by the receding glaciers of the Ice Age, about 12,000 years ago, it began to fill with silt and vegetation. Now it is a warm body of water, no more than four feet deep, with many species of plants growing from its soft bottom and spongy shore. How do forest fires influence this pond? They contribute to change mainly by depositing ash in the water, which in turn nourishes plants and increases their growth, thus speeding up the filling of the pond. This pond is typical of thousands across Riding Mountain. Eventually they will all disappear.

Over thousands of years ponds become dry land.

9. Who Did the Digging?

What has produced these holes in the base of the jack pine and why? This is the signature of

a seldom-seen forest creature. Farther along the trail this question will be answered.

10. The Spruce Forest

It is shady, cool and moist in this black spruce stand. Very little sunlight is able to penetrate the dense network of branches. Competition for this sunlight is intense. As a result, the lower branches of all the trees are dying from a lack of this vital source of energy. Any tree that gets behind in the race toward the sun is soon crowded out by its neighbours.

As the bed of moss and fallen spruce needles builds up on the floor of the spruce forest the soil becomes more and more acid. For this reason, very few plants are able to survive here, except the mosses, twinflower, bishop's cap and bunchberry.

Bunchberry

A spruce forest is the "climax" or end product of the long chain of events which takes place after a fire. Young spruce can germinate and grow in the shade of old spruce. This allows the spruce forest to reproduce itself and to carry on forever, providing the climate remains favourable and the area is not disturbed by fire or man. Try to imagine what our wapiti, moose and white-tailed deer populations would be if all the park were covered by spruce forest. One of the beneficial effects of fire is the creation of variety in the forest, just as you see it along this trail. Fortunately, this is the typical condition throughout Riding Mountain National Park.

11. Wildlife Restaurant

The species of birds and mammals that live in the evergreen forest make very efficient use of the limited food supply available. Two of the large jack pines before you are being used by woodpeckers. It is an amazing fact that six species of our woodpeckers can feed on these trees without competing directly with one another.

On the open ground around the base of the pine the common flicker picks up ants that have left the protection of their nest within the tree. The pileated woodpecker, as large as a crow, cuts rectangular holes deep into the base of the trunk to get those ants that have remained at home, as was seen at stop 9. The northern three-toed woodpecker flakes off loose bark to obtain bark beetles and their larvae. Yellow-bellied sapsuckers drill parallel rows of holes into the tree to obtain the soft inner layer of bark, sap and the insects attracted by the sap. The tiny downy woodpecker feeds on aphids and scale insects among the small branches, as well as digging down for wood-boring beetles. The medium-sized hairy woodpecker feeds on these same beetles, but on the larger branches and main trunk of the tree.

12. Mid-Point on the Trail

The self-guiding nature trail continues to your right over the short boardwalk. From this point it is three-quarters of a mile back along the far loop of the trail to the parking lot on #19 Highway. A hiking trail begins on your left and continues for six-tenths of a mile to Kinosao Lake. The total round-trip distance to this lake from the parking lot is 2.6 miles.

13. Junior Jack Pines

Around you is a dense stand of young jack pines. Cores taken from several of these, by means of an "increment borer", indicate that the whole grove began life in 1954. The regular size and spacing of these trees gives this area the appearance of a pine plantation. However, it is the hand of nature and not of man which has produced this impression. Each tree here requires about the same amount of open ground in order

to obtain minerals, water and sunlight. As the tree gets taller its growing space also enlarges. Thus, each of these young jack pines is competing with its neighbours for survival. Any tree which has its vigour reduced as a result of damage by fungi, insects or mammals will be quickly eliminated.

Young jack pines, such as these, are favoured by moose and wapiti for rubbing the velvet from their antlers in August. This process, known as "fraying", does considerable damage. Bark and branches are scraped off the trunk and sometimes the tree is completely girdled. When this happens it quickly turns brown and dies. Look for signs of fraying as you walk along the trail.

14. The Brûlé

From this hill you can look out across a panorama of jack pines — young and old, thriving and growing, dying and dead. These rolling hills are part of a major glacial moraine which extends across the southern part of Riding Mountain National Park consisting of rocks, gravel and sand laid down by the retreating glaciers of the Ice Age.

As these hills hold very little water in dry weather, fires often sweep across the area clearing away most of the shrubs and deadfalls. As a result, this type of country is easy to walk through. Early explorers, fur-trappers and surveyors travelling through on foot or by horse in summer and by

One is never too old or too young to discover the wonders of nature.

snowshoes or dog-sled in winter, marked "brûlé" on their maps when they encountered an area such as this.

15. The Vanishing Prairie

This patch of prairie grasses and flowers is a remnant of once extensive grasslands. In 1869 Walter Traill, an employee of the Hudson's Bay Company, described this area as "beautiful country in the heart of the mountain, fine rolling prairies covered with islands of fir and oak". At that time fires ran uncontrolled for hundreds of miles. In 1859 H.Y. Hind observed that "the extension of the prairie is evidently due to fires, and the fires are caused by Indians, chiefly for the purpose of telegraphic communication, or to divert the buffalo". In this century, these fires have been largely brought under control.

Three-flowered Avens

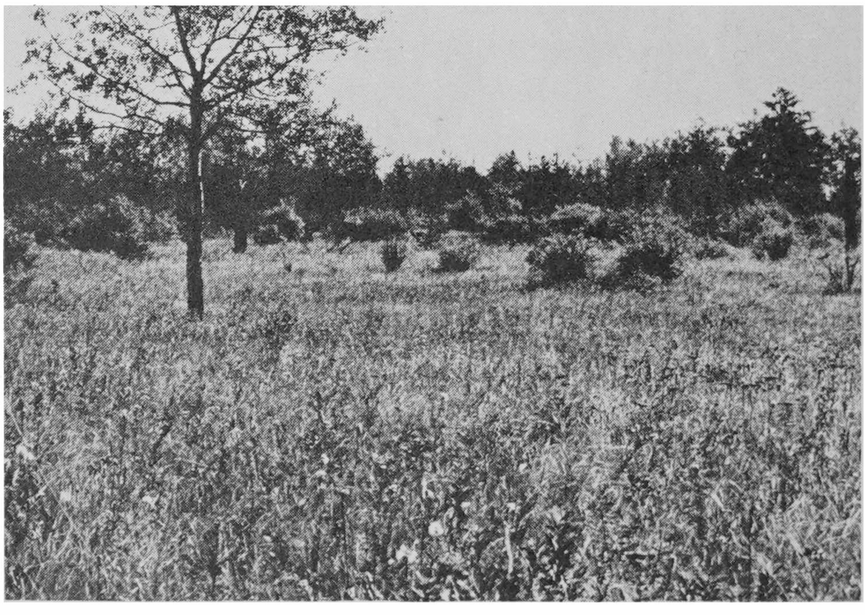
Smooth Aster

How do we know this is a piece of remnant prairie? Examine the grasses and flowers. The common grass here is rough fescue. Its leaves are narrow and tough, each blade folding lengthwise upon itself to prevent transpiration of moisture. Nearby are such typical prairie wildflowers as prairie buttercup (May and early June), three-flowered avens (June), field chickweed (June), black-eyed susan (July and August), smooth aster (August and early September) and stiff goldenrod (August). In the depressions where moisture re-

Heart-leaved Alexanders

Black-eyed Susan

mains, a black loam soil has built up over the years. Northern pocket gophers tunnel through this, pushing up mounds of surplus soil as they go along. Their main enemies are coyotes as well as red-tailed hawks which nest in the nearby pine trees. How long will this remnant prairie survive? No one can say for certain.



In wet years patches of prairie are invaded by shrubs.

16. The Jack Pine's Secret

All along this trail you have seen how this species quickly regenerates after a fire. The important question is how? Notice that along the branches, at regular intervals, there are clusters of cones. A new cluster is added each year as the branch grows outward. Locked under the woody scales of each cone are tiny winged seeds. The whole cone is sealed shut by a hard resin which softens

at a temperature of 116°F. and melts at 122°F. The cones of the jack pine will remain closed and on the tree for 15 years and longer. The seeds can remain fertile within the cones all this time. During hot, dry weather some jack pine cones will open on the trees or on wind-broken branches lying on the ground. However, here in Riding Mountain most jack pine regeneration seems to occur after surface fires sweep across an area preparing a newly-cleared seedbed. On the trees above, cones pop open and seeds slowly rain down onto the soil to start a new generation.

The seeds of the Jack Pine are sealed within stone-hard cones.

17. Man and Nature

On this hike you have seen a variety of patterns within the northern evergreen forest and the ways in which these patterns change over the years. Now you will be able to recognize many of these features as you drive or hike through other areas of the park.

Fire is a natural part of the wild community. Most important, it helps to regenerate and to create a diversity of patterns within the forest. However, there is a different side to this story. Fire out of control can be a devastating force.

It takes approximately 75 years for a mature forest to develop in this park. No generation should be deprived of the experience of walking through tall stands of spruce and pine. A care-

Man, if he wishes, can become part of the forest pattern.

lessly discarded match or cigarette could take this away. Be careful with fire! Make sure campfires and cigarettes are out. Leave it to nature to provide the variety you have seen along this trail.

Check list of plants and animals found along the Brûlé Nature Trail:

TREES

_____ Jack pine (*Pinus banksiana*)
_____ White spruce (*Picea glauca*)
_____ Black spruce (*Picea mariana*)
_____ Trembling aspen (*Populus tremuloides*)

HERBS

_____ Wood lily (*Lilium philadelphicum*)
_____ Field chickweed (*Cerastium arvense*)
_____ Tall thimbleweed (*Anemone riparia*)
_____ Prairie buttercup (*Ranunculus rhomboideus*)
_____ Bishop's-cap (*Mitella nuda*)
_____ Wild strawberry (*Fragaria virginiana*)
_____ Three-flowered avens (*Geum triflorum*)
_____ Alpine sweet-vetch (*Hedysarum alpinum*)
_____ Fireweed (*Epilobium angustifolium*)
_____ Heart-leaved alexanders (*Zizia aptera*)
_____ Bunchberry (*Cornus canadensis*)
_____ Hoary puccoon (*Lithospermum canescens*)
_____ Indian paintbrush (*Castilleja miniata*)
_____ Twinflower (*Linnaea borealis*)
_____ Stiff goldenrod (*Solidago rigida*)
_____ Smooth aster (*Aster laevis*)

_____ Black-eyed susan (*Rudbeckia serotina*)
_____ Common yarrow (*Archillea lanulosa*)
_____ Prairie sage (*Artemisia ludoviciana*)

GRASSES

_____ Rough fescue (*Festuca scabrella*)

FUNGI

_____ False tinder fungus (*Fomes igniarius*)

MAMMALS

_____ Snowshoe hare (*Lepus americanus*)
_____ Red squirrel (*Tamiasciurus hudsonicus*)
_____ Northern flying squirrel (*Glaucomys sabrinus*)
_____ Northern pocket gopher (*Thomomys talpoides*)
_____ Coyote (*Canis latrans*)
_____ Wapiti (*Cervus canadensis*)
_____ White-tailed deer (*Odocoileus virginianus*)
_____ Moose (*Alces alces*)

BIRDS

_____ Red-tailed hawk (*Buteo jamaicensis*)
_____ American Kestrel (*Falco sparverius*)
_____ Common flicker (*Colaptes auratus*)
_____ Pileated woodpecker (*Dryocopus pileatus*)
_____ Yellow-bellied sapsucker (*Sphyrapicus varius*)
_____ Hairy woodpecker (*Dendrocopos villosus*)
_____ Downy woodpecker (*Dendrococpos pubescens*)
_____ Northern three-toed woodpecker (*Picoides tridactylus*)
_____ Tree swallow (*Iridoprocne bicolor*)
_____ Gray jay (*Perisoreus canadensis*)
_____ Common raven (*Corvus corax*)
_____ Black-capped chickadee (*Parus atricapillus*)
_____ White-throated sparrow (*Zonotrichia albicollis*)

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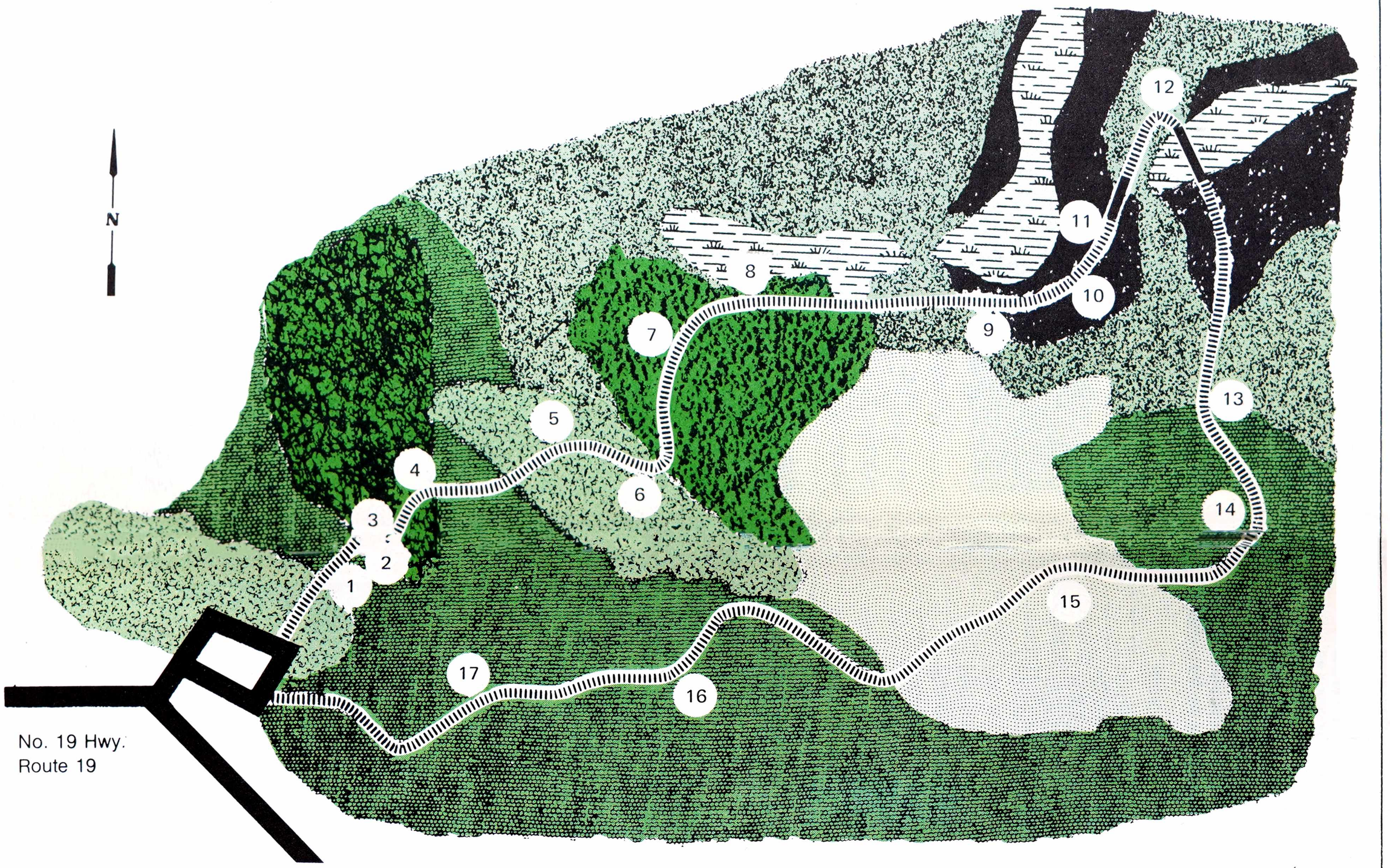
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No. 19 Hwy.
Route 19
Aspen
Peupliers faux-trembles
Pine, Aspen
Pins et peupliers faux-trembles
1971 Burn
Aire incendiée en 1971
Mature Pine
Pins adultes
Marsh
Marais
Boardwalk
Passerelle
Aspen, White Spruce
Peupliers faux-trembles et épinettes blanches
Black Spruce
Épinettes noires
Grassland, Shrubs
Prairies et massifs d'arbustes
Interpretive Trail
Sentier d'interprétation
0 100 200
Scale in feet
Échelle en pieds