The Science Behind Algonquin's Animals

Algonquin Spruce Bogs

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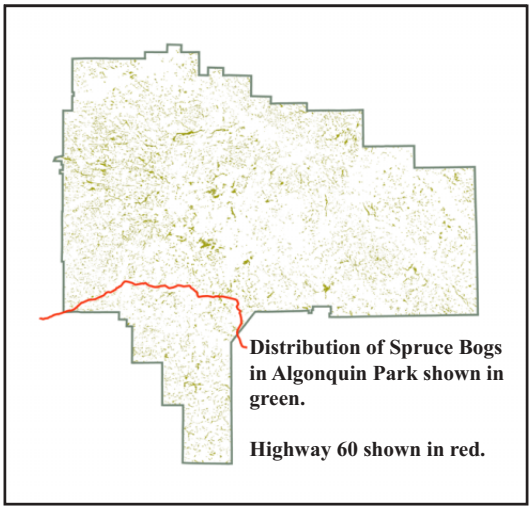
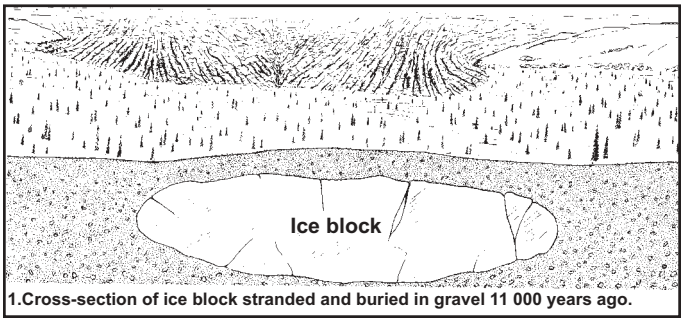
Spruce bogs are one of the five major habitats in Algonquin Park. They are a unique habitat where only a select number of plants and animals can live. The creation of spruce bogs in Algonquin started 11,000 years ago, after the last ice age. As the glaciers retreated, occasionally large chunks of ice would break off, get left behind, and get covered by sand and gravel from the retreating glaciers. When these large chunks of ice melted they formed small lakes. These small, sheltered bodies of water that had little oxygen were highly acidic, and had little or no circulation. This resulted in perfect conditions for the creation of a spruce bog.



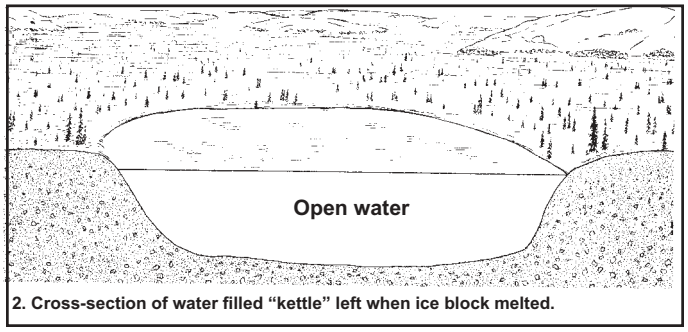
Distribution of Spruce Bogs in Algonquin Park shown in green.

Highway 60 shown in red.



1.Cross-section of ice block stranded and buried in gravel 11 000 years ago.

Eventually, plants begin to get established in the body of water. Growing out from shore, the first plant is a floating, slender sedge known by its Latin name, *Carex lasiocarpa*. This floating sedge gradually grows outwards toward the centre of the lake. As the sedge expands, other plants, such as Sphagnum Moss, Leather-leaf, Cranberry, and Labrador Tea are able to become established on the floating mat. Over time these plants grow and die. The dead plant matter drifts down and settles on the bottom of the lake. There it only partially decays because the water is acidic and low in oxygen. This partially decayed plant matter is known as peat, and after thousands of years enough peat builds up and eventually fills in the shallow sections of the lake.



2. Cross-section of water filled “kettle” left when ice block melted.

As the peat starts to fill in the lake, the floating mat of plants becomes grounded. In areas where

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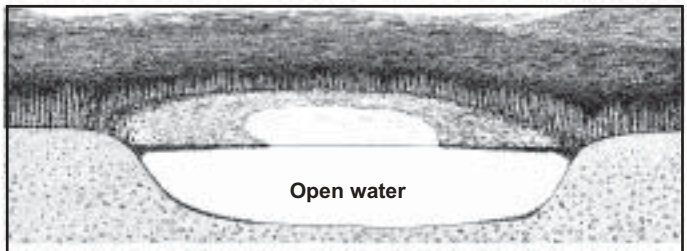
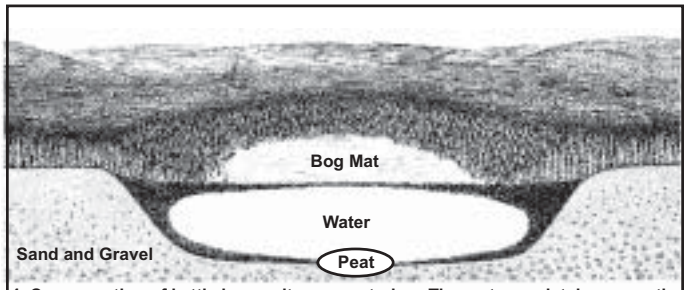


3.Cross-section of kettle as bog mat advances from the edges over the open water.

the peat has not filled in, the mat is still floating and continues to grow towards the centre of the lake. Eventually over thousands of years the lake completely fills in as the dead plant matter continues to accumulate.

As the bog continues to develop the mat becomes solid enough that it can support trees. Black Spruce will dominate the outer edges of the bog while nearer to the open water Tamaracks are found. In time, the Black Spruce at the edge of the bog will advance towards the centre of the bog displacing the Tamaracks. Eventually, where there was once a small lake there will be a forest of Black Spruce.

This whole process from lake to spruce bog to forest takes several thousands of years and not all spruce bogs develop at the same rate. Some bogs may have a small stream running through them and the current will prevent the floating mat from completely covering the water. At other times, flooding caused by beavers can also affect the formation of a bog. Even after 11,000 years, bogs in Algonquin Park continue to exhibit every stage of development, from small, open lakes to Black Spruce forests.



4. Cross-section of kettle bog as it appears today. The mat completely covers the water and trees have started to close in.

In a spruce bog the only soil that plants have to grow in is the peat, the partially decayed plant matter. Peat has few minerals and is very poor in nutrients, making it difficult for many plants to survive in a spruce bog environment. Those plants that do grow in a spruce bog have special adaptations in order to survive. Plants like Leather-leaf and Labrador Tea are evergreen, keeping their leaves throughout the year. By not losing their leaves they are able retain their important nutrients like potassium, phosphorus, and nitrogen for a longer period of time and do not have to rely on the peat for more nutrients.

While keeping their leaves helps with retaining nutrients it also contributes to another problem, water loss. These evergreen plants lose water through the pores in the leaves year-round. In the late fall and early spring the roots of these plants are encased in ice preventing them from absorbing water. In order to prevent or slow down water loss during this time, Labrador Tea has adaptations that are common to desert plants. The leaves of Labrador Tea are curled under and the underside of each leaf has a downy surface. Both of these features reduce the amount of water lost into the air.

Two other specialized plants in the spruce bog get their nutrients from a different source. The Pitcher-plant and the Round-leaved Sundew capture insects and digest them to obtain nutrients. The leaves of a Pitcher-plant are shaped like a pitcher, hence the name. In the bottom of each leaf is accumulated rainwater. Insects are attracted to the red on the leaves and by the nectar-producing glands and inevitably fall into the tiny pools of water. The insects are unable to escape due to the smooth, slippery leaf walls lined with downward-pointing hairs. They eventually drown and the body is broken down by bacteria and enzymes from the Pitcher-plant until it can be absorbed into the plant.

The Round-leaved Sundew has green leaves that are covered with many red bristles. On the end of each bristle is a tiny ‘dew’ drop which is very sticky. When an insect lands on a leaf of a Sundew it is caught by the sticky drop. As it struggles it becomes more stuck and the Sundew closes the leaf bringing more sticky drops into contact with the insect. These small, sticky droplets contain a digestive enzyme which break down the body of the insect and allows the Sundew to absorb the much-needed nutrients. Only when the insect is completely consumed will the leaf open.

By capturing and digesting insects the Pitcher-plant and Round-leaved Sundew are able to obtain enough essential nutrients in order to survive in the harsh spruce bog environment.

Very few animals make the harsh world of a spruce bog home. The acidic, low-oxygenated waters are unsuitable to support fish and amphibian life. This absence results in an abundance of aquatic insects.

The Black Spruce forests surrounding a bog are the home to several birds that would not be found in Algonquin if it were not for the spruce bog. The beautiful Spruce Grouse, a northern resident rarely found south of Algonquin, is a year-round resident of the spruce forest. As food is scarce during the

winter, the Spruce Grouse survives by feeding on the nutrient-poor needles of the Black Spruce. Most visitors to Algonquin will recognize Black-capped Chickadees. Algonquin is also home to another chickadee that has a brown cap, the Boreal Chickadee, which is at its southern range in Algonquin Park and is a common resident of Black Spruce forests. Another bird that is also at its southern range in Algonquin is the Gray Jay. The Gray Jay is one of the few birds that over-winters in Algonquin. They are able to survive the harsh winter conditions by storing food throughout the year. They nest in the late winter while there is still several feet of snow on the ground. By nesting early young Gray Jays are fledged by early spring, allowing the adults more time for gathering and storing food for the next winter.

During the spring and summer, the Black Spruce forests of Algonquin's bogs are also home to many seasonal birds. Different species of warblers, such as the Common Yellow Throat and Nashville, can be found foraging for insects. Cedar Waxwings, Swamp Sparrows, Olive-sided and Yellow-bellied flycatchers, and Golden-crowned Kinglets are just some of the other seasonal residents that inhabit Algonquin's spruce forests. As winter approaches, insects, the main food sources for many of these birds, disappear. To deal with this food shortage and the colder temperatures, many birds migrate south for the winter. The problem of finding enough food to survive is thus avoided, but many migrating birds do not survive their journeys. Over half the Golden-crowned Kinglets die each year on their annual migration south.

Spruce bogs are sometimes used as rendezvous sites by wolves during the summer months. They are often ideal places for the adult wolves to leave the pups while the remainder of the pack goes off to hunt. The open area of the bog provides a place for the pups to play and hone their hunting skills by chasing insects and small mammals. The nearby spruce forest provides shelter for the pups during the heat of the long August days.