by Christine Petersen

A Tree for All Seasons

Minnesota's most common tree species, aspen, is good for wildlife and people.

There's nothing I like more than a long walk. And wherever I hike in Minnesota, I find trees: tall trees and tiny ones, some with branches spreading into a wide, rounded crown and others reaching tall and slender toward the sky.

Minnesotans are lucky—we live in a tree-full place. Forests here cover more area than the states of New Jersey, New Hampshire, and Vermont combined. And in those forests are 53 *native species*—trees that naturally grow in this part of North America, rather than being brought here from other regions.

This past year, while exploring parks and open spaces around the state, I began to wonder: *What's the most common kind of tree in Minnesota?*

Before researching the answer, I asked my friends, family, and coworkers their thoughts. Interestingly, there were many different answers. Some people guessed maple, ash, or pine. Others suggested oak or elm. Everyone was surprised when I revealed the winner: aspen.

Minnesota has more aspen trees than any other state. They grow in almost every Minnesota county—and across much of the United States and Canada. What makes aspen so successful, and why are they such an important part of Minnesota's natural environment? Let's find out!

COURTESY OF WELBY SMITH, DNR

A stand of aspen grows alongside a road in Lake County in northern Minnesota.

Quaking aspen leaves have tiny teeth along the edges.

Bigtooth aspen leaves have–you guessed it—wider teeth.

Know Your Aspen

Aspen isn't a single kind of tree—it's a category that includes two similar species called quaking aspen and bigtooth aspen.

All aspen trees have smooth, whitish-green bark that becomes gray and rough with age. Dark, eye-shaped scars mark the trunk where old branches have fallen off. To tell the two species apart, check their leaves. On quaking aspen (*Populus tremuloides*), the leaves are oval, with a pointed tip and many tiny teeth along the edges. Bigtooth aspen (*Populus grandidentata*) have slightly larger, triangular leaves fringed with wider teeth that give this species its name.

Similar and different. Aspen aren't the only trees in Minnesota with white bark. Paper birch also shares this trait. But unlike aspen, birch bark peels away in thin strips, revealing a salmon-colored layer beneath.

Here's another way to tell aspen from other trees in Minnesota. Pick up a leaf, even if you don't know what kind it is. Find its *petiole*—that's the tiny stalk connecting the leaf to a tree branch. It will probably feel round, like a drinking straw. You can easily spin it between your fingers.

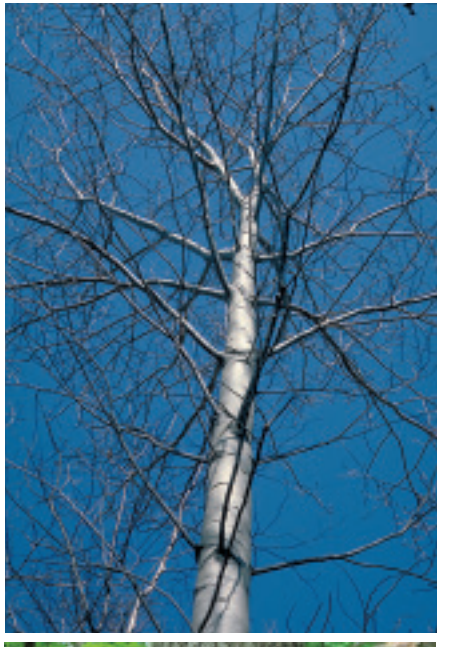
If the leaf pops from side to side instead of spinning smoothly, it's an aspen or one of its closest relatives. Their leaves have a flat petiole. That's an unusual feature, with a wonderful effect. A flat petiole causes aspen leaves to wobble and rattle against each other in the slightest breeze. In autumn, their movement makes a soothing sound like gently flowing water.

Aspen everywhere. On my walks, I try to notice the different kinds of trees—even if I can't identify all of them. I sometimes find aspen in the middle of a woodland. But they are more likely to grow along the edges between forests and open spaces, or to push like fingers into prairies and abandoned farm fields.

That's part of the magic of aspen. Biologists call them *pioneer species*, because aspen are among the first trees to grow in places of change and disturbance.

Change = Opportunity. Natural forces like wildfire and floods can cause a lot of damage. That's why people work hard to prevent them. But in nature, change creates opportunities. Fire clears out dense growth on the forest floor. Ashes add nutrients to the soil. Dead trees—whether standing or fallen—allow sunlight to bathe parts of a forest that are usually shaded. And that's exactly what aspen need to flourish.

Human activity can also encourage aspen growth. In the mid-1800s, settlers arrived in Minnesota. They cut down trees and plowed prairie to grow crops. Aspen popped up in these open spaces, even in parts of Minnesota where it hadn't grown before. Today, many aspen woodlands are grown as a crop that can be carefully logged to provide material for building boxes, furniture, and houses. Aspen wood can also be ground up to make paper or pressed into pellets that are burned for energy.



COURTESY OF WELBY SMITH, DNR

This mature bigtooth aspen has deeply furrowed bark low on the tree and smooth bark up high.

Aspen can grow from pollen and eggs contained in their flowers. From left: female flowers of quaking aspen, male flowers of quaking aspen, female flowers of bigtooth aspen, and male flowers of bigtooth aspen.

COURTESY OF WELBY SMITH, DNR

Seeds and Clones

Like other trees, aspen can grow from seeds. This process begins with flowers. Male flowers produce *pollen*, and female flowers have *eggs*. If the right kind of pollen reaches a female aspen flower, it merges with the egg to form a seed. Each aspen seed is attached to a fluffy clump of hairs. The hairs catch the wind, airlifting the tiny seed to a new place.

A single aspen tree can produce more than a million seeds, but only a few will survive. If a seed happens to land where conditions—light, space, moisture, and more—are just right, it starts to grow. In a few decades, it might stand 70 feet or taller.

Hey, little bud. Little aspen trees don't just grow upward. They put a lot of energy into forming roots. A main *taproot* sinks downward, reaching for water and nutrients deep in the soil. Other roots grow out into the surrounding soil far from the tree.

Have you ever noticed the little bumps on bare twigs in winter? They are *buds*, containing new flowers or leaves that will open when spring days are sunny and warm enough. Aspen trees also produce buds on their spreading roots. After a tree is damaged or cut down, each root bud forms a new stem.

A northern Minnesota landowner stands amid young aspen trees on his property. They will provide food for deer and other wildlife and nesting cover for birds.

BILL MARCHEL

All the little stems produced by the same root system form a *clone*. The new trees are identical to the original tree.

There might be thousands of stems in a young aspen clone. The little trees are crowded together like blades of grass in a lawn. People and other large animals can't get through these *thickets*, and other plants can't grow below.

Every year, some aspen stems die from lack of sunlight. Others are damaged by freezing cold, insects, or diseases. The survivors continue to grow, until just a few tall, strong aspen remain.

After the aspen. Aspens don't live as long as some other kinds of trees—usually less than 150 years. But they create conditions that allow other plants, trees, and wildlife to thrive long into the future.

As space is created between aspen stems, wildflowers and tall grasses begin to pop up on the forest floor. Shrubs and small trees fill the space, too. These may be joined by young oaks, maples, pines, or other trees that slowly grow taller than aspen. Unless there is a fire or other event, their shade will eventually kill the aspens and a new kind of forest will take over.

Atop an aspen log, a ruffed grouse performs a mating ritual that creates a deep drumming sound.

BILL MARCHEL

Aspen for Animals

Aspen trees support many kinds of wildlife through the seasons and different stages of their growth. When I wander in a summery aspen woodland, I hear frogs calling from their hiding places on the forest floor. In winter, I see broken twigs where deer and moose have nibbled. And any time of year, I may find aspen stumps near lakes and streams. Their tops are pointed and marked with lines—the toothmarks of hardworking beavers, which chew down aspen for lodge-building and winter food.

Rodents and other small mammals also find hiding places and food among the aspen. Migrating birds stop to rest and feed on abundant insects before continuing their long travels. Other birds—from warblers and woodcocks to hummingbirds and finches—build their nests in or below aspen trees. In turn, these creatures feed pine martens, bobcats, hawks, and other predators.

A great place for grouse. Ruffed grouse also depend on healthy aspen trees. These round-bodied birds spend a lot of time on the ground in aspen and other woodlands, mostly in the northern half of Minnesota. Mother grouse builds her nest in an aspen thicket, where predators can't easily sneak in. Young chicks scrape through aspen leaves on the ground in search of insects. And in winter, grouse of all ages fill up on aspen twigs, buds, and catkins.

Elk, such as this bull, live in northwestern Minnesota where prairie and farms meet aspen woodlands.

RICHARD HAMILTON SMITH

Return of the elk. Minnesota's native people have long understood the value of aspen trees, known as *azaadi* in the Ojibwe language. Traditionally, Ojibwe people made aspen wood into paper. Large aspen stems were cut to build lodges, and the roots and bark were used as medicines.

Now people are working to bring back a lost species that once lived among the aspen—elk, which the Ojibwe call *omashkooz*. Like aspen, elk were an important traditional resource for the Ojibwe. These large, hooved relatives of deer and moose provided a lot of meat. The hide, antlers, and other body parts could be made into clothing, tools, and more. But elk became rare soon after Minnesota was settled by Europeans. Too many were hunted, and their habitat was lost as the land was cleared for farming.

Today, Minnesota has three small elk herds near the state's northwestern border with Canada, where prairies still grow near aspen woodland. Elk feed on a mixed diet of prairie grasses and nutritious aspen twigs. In winter, aspen provides shelter from weather and hungry wolves.

The Fond du Lac Band of Lake Superior Chippewa recently offered another solution. They hope to move elk from the state herds onto the Fond du Lac State Forest and Fond du Lac Reservation in northeastern Minnesota, in an area where the animals have not been found for 150 years. There, forests could be managed for elk.

An aspen stand near Brainerd turns yellow in fall. Dry aspen leaves can make a gentle rustling sound in the breeze.

BILL MARCHEL

Year-Round Resource

All trees use a process called *photosynthesis* to make their own food. Sunlight, water, and carbon dioxide gas are collected into the leaves. Molecules called *chlorophyll* combine those ingredients to make sugars that help the tree grow. Chlorophyll also gives leaves their green color.

In autumn, many tree species lose their leaves and shut down until spring. Aspens take a slightly different approach. Their leaves fall away, but a little bit of chlorophyll is found inside the tree's thin bark. This allows aspens to keep photosynthesizing all winter long. The tree stores up energy, and the bark is good food for rabbits and hares, porcupines, and other gnawing mammals.

Growing for the future. Some kinds of disturbance help aspen grow and spread. But aspen will be challenged by climate change. As our region experiences warmer temperatures, these lovely trees may be pushed into cooler regions north of Minnesota.

For now, aspen trees are one of Minnesota's most important natural resources. They provide habitat and beautiful scenery in many state parks, forests, and wilderness areas. You needn't travel to enjoy aspen, though. They probably grow in backyards, parks, and roadsides right in your neighborhood!

Teachers resources. Find a Teachers Guide and other resources for this and other Young Naturalists stories at *mndnr.gov/young_naturalists*.