



Fires in these forests are often severe. They burn most of the fuels on the ground and consume the tree crowns too. The forest that grows in after a large crown fire has trees all about the same age.



Like seams on a quilt, lines between forests of different ages show on the mountainside. The "seams" of this quilt are the boundaries between crown fires that occurred several years apart.

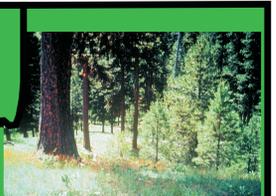
After fire burns the crowns of the pine trees in this forest, seed rains down from serotinous cones opened by the fire's heat. A year or two later, hundreds of seedlings carpet the ground.



In the past, most fires in these forests were underburns. They burned dead pine needles, fallen tree branches and trunks, grasses, and bushes on the forest floor.



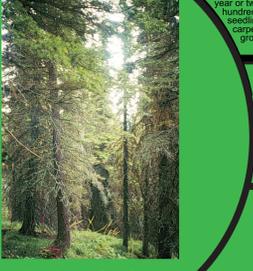
Fires used to occur every few years in these low, dry forests.



Old growth forest at low elevations have both big and small pine trees. They have some fir thickets and many grassy openings.



Black-backed Woodpeckers feed on beetles that live in fire-killed trees. For nesting, they choose places where the fire crowned and burned large areas. Black-backed Woodpeckers excavate their nest holes in large burned trees that are rotten in the center.



### Lodgepole pine forests



Blue huckleberry bushes won't grow where it's dry, and they don't like very hot or very cold conditions. Their roots are buried in the soil, so fire rarely kills the whole plant. You can find the juiciest huckleberries in large burned areas.



Pileated woodpeckers need very large trees with rotten centers for their nests. They excavate their nest holes high above the ground. Male and female birds take turns incubating their eggs. After the eggs hatch, the parent birds feed insects to the hungry nestlings.



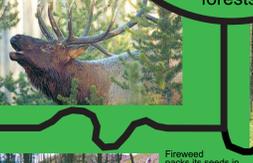
### Ponderosa pine forests



Flammulated Owls nest in the forest's biggest trees. They often use nest holes made years before by pileated woodpeckers. These tiny owls eat moths from the tree tops and grasshoppers from openings and meadows.



In the summer, Native Americans visited dense forests of young pines to cut new poles for their tipis. This photo of a Nez Percé encampment was taken around 1900.



Elk use dense forests at middle elevations to hide from hunters in the fall and mountain lions in winter. Dense forest develops a few decades after a severe burn at these elevations.



Fireweed picks its seeds in downy fluff. That way, the wind carries them a long way, even into the middle of large burns where most of the trees were killed. Fireweed grows well in the hot, bare soil.



Mountain pine beetles lay their eggs in the cambium of pine trees. When the eggs hatch, the larvae eat the cambium. This kills the tree. When beetles invade a dense forest where most trees are the same age, beetle populations build fast and kill most of the trees.



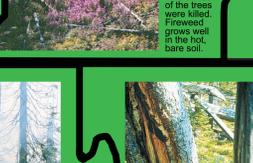
Elk visit low elevation forests and meadows early in spring. There they find the first green grass of the year.



Armillaria root disease, the fungus that makes these mushrooms, is one of the largest living things in the world. Its underground parts cover hundreds of acres. Armillaria kills Douglas-fir trees of all ages and creates large, open patches where pine trees grow well.



Today, this kind of pine - straight and densely grown after a large, severe fire - still provides material for people's homes and furniture.



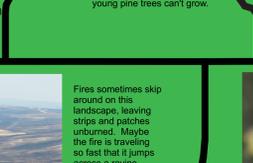
Subalpine firs grow well in sun or shade, but pines outgrow them in openings created by crown fire. A hundred years after the fire, beetles may kill most of the pines. Then the subalpine firs will become the tallest trees.



Douglas-fir grows well in low-elevation forests. It can grow in shade where young pine trees can't grow.



Arrowleaf balsamroot colors the hillsides at low elevations in springtime. If burned, it grows back the next spring from a thick, woody underground stem.



Fires sometimes skip around on this landscape, leaving strips and patches unburned. Maybe the fire is traveling so fast that it jumps across a ravine without burning through it. Or maybe it reaches the edge of a moist river bottom, where cottonwoods and ash trees grow and the fuels are too moist to burn. Or maybe the wind changes and it turns to run in a completely different direction.



The grasses that blanket these open lands have tiny flowers of many shapes and colors. Nearly all of these grasses are perennials, with roots that can find water deep in the soil even if it hasn't rained for weeks.



At high elevations, trees and other plants often grow in clusters. Fire spread depends on the plant cover. Where plants are sparse, fires burn only in patches. Where subalpine firs are tall and their branches are dense, fire can climb up into the crowns of large pine trees.



Summers are cool and short in high-elevation forests. Fires do not occur often. When a fire does come through, it may kill only the smaller trees. It often damages the thin bark of the pines that live at high elevations, leaving scars like these.



Pine seedlings grow in clusters from seed caches left by Clark's Nutcrackers. If they get enough sun and moisture, and if they can resist the rust fungus that kills 5-needled pines, they will grow a new forest high in the mountains.



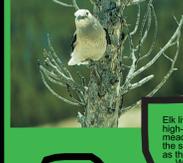
Fires race through this open landscape every few years. They are often driven by strong winds, and their main fuel is dry grass. The fires sometimes spread so fast that they don't have time to heat up the soil.



Sharp-tailed grouse eat the grasses and wildflowers that thrive after fire in this grassland. Fire keeps their dancing grounds ("leks") open so the males have plenty of room to display during the mating season.



Willows form thickets in wet swales and river bottoms, providing shelter and food for animals, especially in winter. Moisture keeps most fires out of the willow thickets. If they do burn, the willows sprout and grow tall again in a few years.



Every summer, the Clark's Nutcracker harvests thousands of fatty seeds from pine cones. It buries the seeds so it can find and eat them year-round. Some seeds are never found. They can grow up into clusters of new trees.



Elk live in high-elevation forests during the summer. The fires are not as thick here as they are below. While plants in lower forests are already brown and dry, the plants here are still green and fresh. Elk like to wallow in wet, muddy spots in high mountain basins.



Grizzly bears are almost always searching for food. If they find a squirrel's cache of pine cones, they have a feast. The white, fatty seeds of high elevation pines are one of their favorite foods in late summer and fall.



Pronghorns, the fastest mammal in North America, graze on the many wildflowers that grow here. Pronghorns live in open, rolling grasslands where they can see for miles.



Millions of bison lived in this open, grassy land in centuries past. Bison feed on most of the plants in this land, but they're especially fond of the grasses. They move from place to place throughout the year, leaving the grasses trimmed short but able to produce new growth for the next grazers who pass by. The people who lived in the buffalo's homeland used every part of this huge animal for food, clothing, shelter, and tools.



Ants don't let anything in this grass-covered land go to waste. These master architects create vast underground tunnels where they feed and care for their queen and thousands of larvae. Their hard work enriches the soil, and many animals, from birds to bears, love to dine on them.



Birds, squirrels and bears eat these nutritious seeds from pine trees. Native Americans used to travel high into the mountains to harvest them each year.



Smooth woodrush is a grass-like plant living in high-elevation forests. In the fall, woodrush leaves form a rust-colored carpet on the forest floor.



White pine blister rust is a fungus that was accidentally brought to North America from Europe. It came to the Rocky Mountains about 1920. Blister rust kills 5-needled pines by girdling the stems. In older trees, it kills the tops, where needles and cones are found. It has killed about 90 percent of the 5-needled pines in Montana and Idaho.



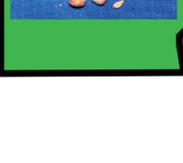
Here the shrubs aren't tall enough to hide predators, and it's hard for hunters to find a deep ravine or a cluster of trees where they won't be seen.



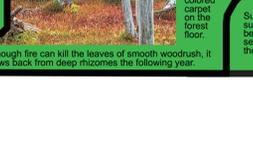
With their yellow faces and dark eyes, black-eyed susans look up at the sunlight in this open, grassy land. A constant stream of insect visitors sip nectar from the flowers and carry pollen from one blossom to another so the plants can make seeds.



Black-eyed susans often thrive in the sunny conditions that follow fire and in warm, ash-darkened soils.



Although fire can kill the leaves of smooth woodrush, it grows back from deep rhizomes the following year.



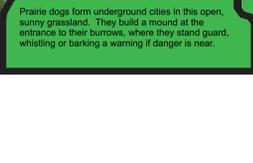
Subalpine fir grows well at high elevations, in both sun and shade. Where pines cannot grow well because of shade, and where they cannot produce seed because fungus has killed their high branches, these firs will become the next forest.



Prairie dogs form underground cities in this open, sunny grassland. They build a mound at the entrance to their burrows, where they stand guard, whistling or barking a warning if danger is near.



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