



NATURE DETECTIVES

FIRE!

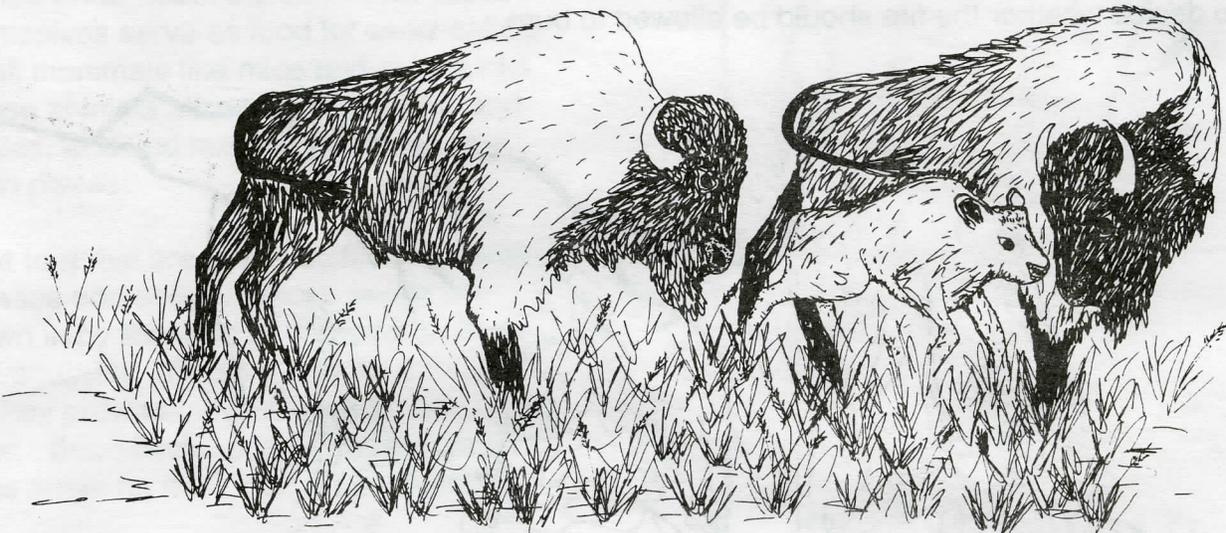
A bolt of lightning, the thundering crash of an old snag, the acrid smell of pine needles burning— a forest fire begins. The doe grazing in the meadow perks up her ears and twitches her nostrils. Instinctively she knows she can outrun the fire as it comes closer. She continues grazing until the fire forces her to move. The fox, mountain lion, and bear also run to safety. Smaller animals, such as snakes, rabbits and chipmunks, move underground to wait out the fire in their burrows. Birds fly take flight. Meanwhile, fire officials try to decide whether the fire should be allowed to burn.



Grandfather Fire

Fire is as natural as rain. Ever since there have been plants on earth dry enough to be lit by lightning, fires have been a part of nature's cycles. Native Americans watched these cycles and learned that fire could make the land better for wild animals— animals the Indians needed for food, shelter, tools and clothing. So they lit fires in the grasslands, burning away shrubs and dead grass. The roots of the grasses survived and sent up succulent, green shoots everywhere. Soon the bison came to graze. The Indians also lit fires in the forests, creating clearings where wildflowers, shrubs and grasses grew. These plants fed the deer, elk and rabbits. Because Native Americans had so much respect for its power, many tribes referred to fire as Grandfather Fire.

When pioneers first came to this country they used fire to clear land for farms. Miners lit forest fires to get a better view of the rocks beneath the trees and grasses. They then stayed in the mountains and built towns. When the forests began to grow back people feared that their homes would burn. They began putting out natural lightning fires. Nature's cycles were interrupted.



Hot Fires

Smokey the Bear says, "Prevent forest fires!" For many years, we believed that all forest fires were bad. The more we tried to keep fires out of the forest, the more we allowed fuel — leaves, pine needles, dead branches, and logs — to pile up on the forest floor.

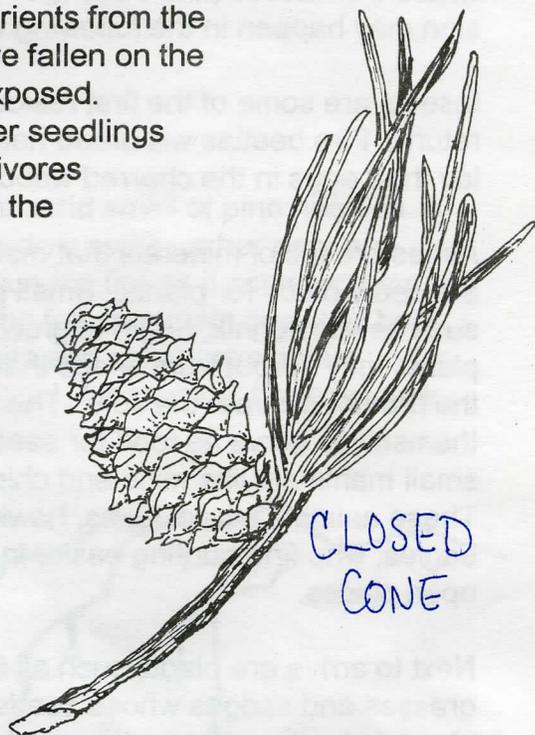
When there are no natural fires, a forest becomes dense. More and more trees grow, creating a canopy which blocks out the sun and water that healthy plants need to grow. The mountain pine beetle infests many of these crowded, unhealthy trees. Even more fuel is created as these trees die. Now if lightning strikes, a fire may get out of control. Crown fires spread from treetop to treetop. Down below the fire burns so hot that the soil is sterilized. After the fire, grasses and other plants can't take root in this barren earth and rains wash away the topsoil. The ecosystem has changed.



Fire Lends a Helping Hand

Can a forest fire have any benefits? Surprisingly, the answer is YES. Wildfires sweeping through a forest clean up the floor by burning dead leaves and twigs, and killing harmful insects and fungi which live under these leaves. The fire makes a forest healthier by burning unhealthy and dead trees. The burning is like very fast composting. It releases nutrients from the decaying plant matter back into the soil. Seeds that have fallen on the forest floor only to be buried by dead leaves, are now exposed. These seeds sprout and produce new plants. The tender seedlings attract herbivores, or plant-eating animals. In turn, carnivores arrive to hunt. A burn-site is an excellent place to watch the food chain in action.

Some plants need fire to multiply. Lodgepole pines produce two kinds of cones. One opens by itself and releases its seeds. The other is covered by a sticky resin. This resin melts when it is heated. Therefore, these cones will release seeds only after they are exposed to temperatures reaching 120 degrees Fahrenheit (that is hotter than some of the hottest days we have in Colorado). Deerbrush, a bush that deer like to eat, has seeds that have a hard coat. These seeds need to be opened up by fire for the seedlings to germinate. Fireweed, a plant with lovely purple flowers, does not grow well in the shade. After a fire, it can spread to sunny patches created by the burning down of trees. Thus, a low-level fire in a healthy forest is good for animals, plants, and the forest itself.



CLOSED
CONE



OPEN CONE



WINGED
SEEDS



What Happens Next?

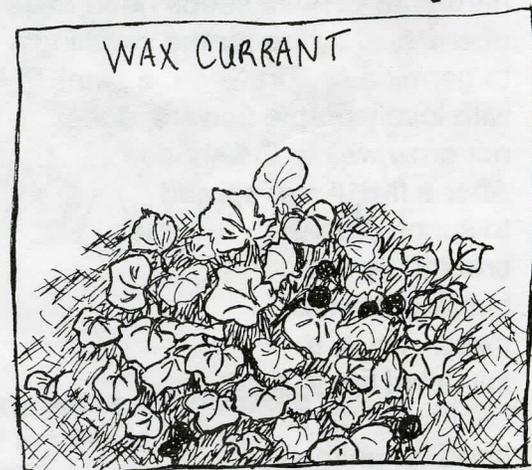
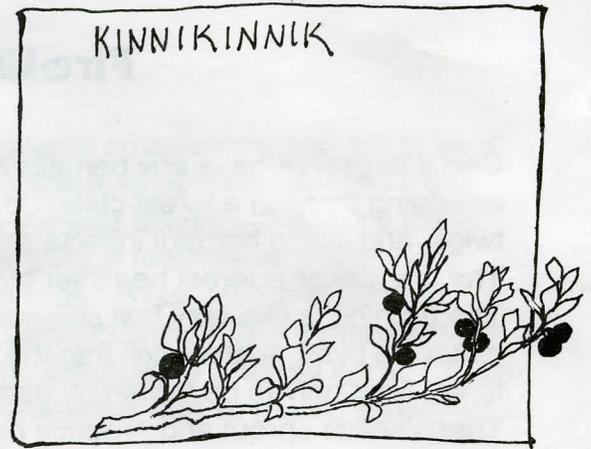
When a forest burns, what took centuries to grow is reduced to ashes. But gradually, life returns. Different plants and animals come and go in a process called succession. For example, in the foothills of Boulder County, where Ponderosa pine trees grow, succession may happen in the following way.

Insects are some of the first residents to return. Fire beetles will breed nearby and lay their eggs in the charred wood.

Ashes are full of minerals that make the soil a friendly place for plants. Small plants, such as kinnikinnik, begin to grow. These plants may sprout from seeds that survived the fire underneath the soil. The seeds themselves serve as food for seed-eating, small mammals like mice and chipmunks. These animals attract foxes, hawks, and eagles, who find hunting easier in these open places.

Next to arrive are plants such as fireweed, grasses and sedges whose seeds are blown in by the wind or dropped by birds and squirrels. These plants attract wildlife as they provide food for insects, rabbits and deer. Soon birds, coyote and mountain lions arrive for their food is now plentiful.

Slowly, small bushes, such as wax currant and gooseberry, make this fertile place their home. However, they also make shade, causing some of the earlier plants to die. This shade provides the perfect environment for trees to sprout. Aspens shoot up from their big root systems that are still alive underground. Ponderosa pine trees begin to reach towards the sun. Elk feed on the aspen bark, and Abert squirrels cache away pine cones. Eventually, the forest will look like it did before — until the next forest fire. And then, the cycle continues.



Join the Nature Detectives to look at succession after a real fire. See page 10 for details.